VOLUME 20 / NUMBER 19
OCTOBER 8, 1982
ACC. NOS. N82-28243 TO N82-29260

Astr

The University of Michigan Astronomy Library

ASTRONOMY
TL
501
.S42
V.20
N019

STAR
AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remit tances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 20, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through **February 28, 1985.**

US ISSN 0036-8741

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

83 10 279AA5 2 013 1 SN 1 3469

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, at the standard $4.00 price, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($6.00 domestic; $12.00 foreign). Microfiche are sold at price code A01 ($4.00 domestic; $8.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services, in addition to the distribution of NASA scientific and technical reports and of *STAR* and its cumulative indexes, is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
Attn.: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $50.00 North America; $100.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1982)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.00	$ 8.00
A02	001-025	6.00	12.00
A03	026-050	7.50	15.00
A04	051-075	9.00	18.00
A05	076-100	10.50	21.00
A06	101-125	12.00	24.00
A07	126-150	13.50	27.00
A08	151-175	15.00	30.00
A09	176-200	16.50	33.00
A10	201-225	18.00	36.00
A11	226-250	19.50	39.00
A12	251-275	21.00	42.00
A13	276-300	22.50	45.00
A14	301-325	24.00	48.00
A15	326-350	25.50	51.00
A16	351-375	27.00	54.00
A17	376-400	28.50	57.00
A18	401-425	30.00	60.00
A19	426-450	31.50	63.00
A20	451-475	33.00	66.00
A21	476-500	34.50	69.00
A22	501-525	36.00	72.00
A23	526-550	37.50	75.00
A24	551-575	39.00	78.00
A25	576-600	40.50	81.00
	601-up	--1	--2

A99 - Write for quote

1 Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up

2 Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E99 - Write for quote		
N01	30.00	45.00

VOLUME 20 NUMBER 19 OCTOBER 8, 1982

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 2635

02 AERODYNAMICS 2635

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 2638

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 2639

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications.*

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 2640

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

06 AIRCRAFT INSTRUMENTATION 2642

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

07 AIRCRAFT PROPULSION AND POWER 2643

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

08 AIRCRAFT STABILITY AND CONTROL 2643

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 2644

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 2645

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

13 ASTRODYNAMICS 2645

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 2646

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air).*

15 LAUNCH VEHICLES AND SPACE VEHICLES 2646

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 2647

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING 2647

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

18 SPACECRAFT DESIGN, TESTING AND PERFORMAN ,E 2650

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

19 SPACECRAFT INSTRUMENTATION 2650

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 SPACECRAFT PROPULSION AND POWER 2650

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 2651
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 2651
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 2653
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 2659
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 2663
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 2666
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) 2669
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 2672
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 2679
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 2683
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 2688
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 2690
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 2693
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 2695
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 2696
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) 2700

43 EARTH RESOURCES 2700
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 2712
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 2720
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 2722
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 2725
Includes weather forecasting and modification.

48 OCEANOGRAPHY 2732
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) **2734**
Includes genetics.

52 AEROSPACE MEDICINE **2740**
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES **2743**
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **2744**
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY **N.A.**
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **N.A.**

60 COMPUTER OPERATIONS AND HARDWARE **2746**
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE **2747**
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS **2753**
Includes computer networks.

63 CYBERNETICS **2753**
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS **2754**
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **2756**
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **2758**
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **2758**
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) **2758**
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS **2759**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS **2761**
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS **2763**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS **2765**
Includes light phenomena.

75 PLASMA PHYSICS **2767**
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS **2771**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS **2773**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **2773**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **2773**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **2774**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **2775**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **2776**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **2776**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **2777**

89 ASTRONOMY **2777**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **2777**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **2778**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **2778**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **2779**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

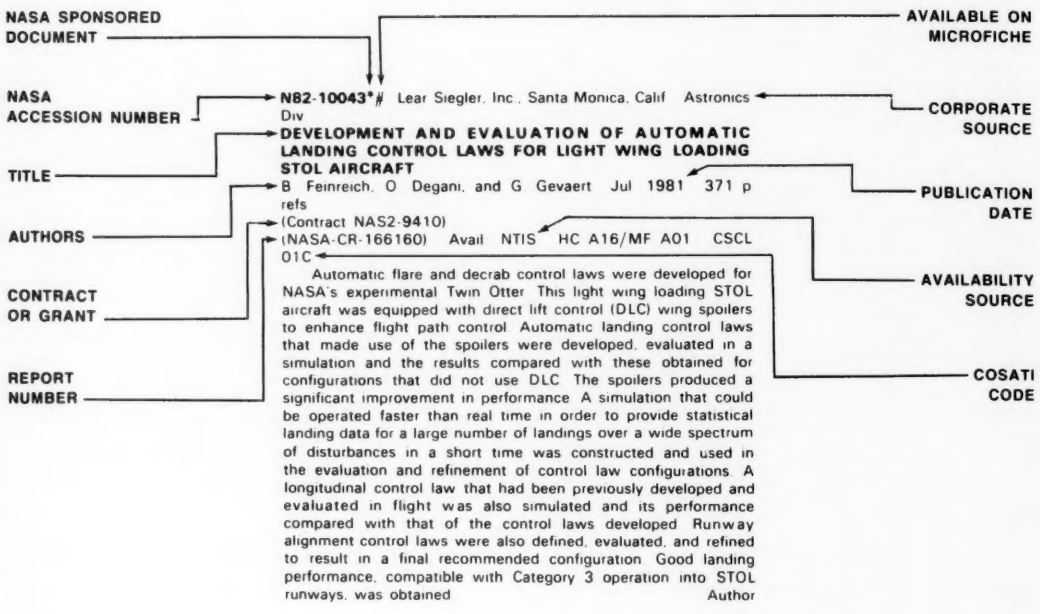
GENERAL

99 GENERAL **2779**

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX **I-1**
PERSONAL AUTHOR INDEX **I-65**
CORPORATE SOURCE INDEX **I-73**
CONTRACT NUMBER INDEX **I-89**
REPORT/ACCESSION NUMBER INDEX **I-93**

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N82-10043*# Lear Siegler, Inc., Santa Monica, Calif. Astronics Div
CORPORATE SOURCE
TITLE
DEVELOPMENT AND EVALUATION OF AUTOMATIC LANDING CONTROL LAWS FOR LIGHT WING LOADING STOL AIRCRAFT
AUTHORS
B. Feinreich, O. Degani, and G. Gevaert Jul 1981 371 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Contract NAS2-9410)
(NASA-CR-166160) Avail: NTIS HC A16/MF A01 CSCL 01C
AVAILABILITY SOURCE
REPORT NUMBER
COSATI CODE
Automatic flare and decrab control laws were developed for NASA's experimental Twin Otter. This light wing loading STOL aircraft was equipped with direct lift control (DLC) wing spoilers to enhance flight path control. Automatic landing control laws that made use of the spoilers were developed, evaluated in a simulation and the results compared with these obtained for configurations that did not use DLC. The spoilers produced a significant improvement in performance. A simulation that could be operated faster than real time in order to provide statistical landing data for a large number of landings over a wide spectrum of disturbances in a short time was constructed and used in the evaluation and refinement of control law configurations. A longitudinal control law that had been previously developed and evaluated in flight was also simulated and its performance compared with that of the control laws developed. Runway alignment control laws were also defined, evaluated, and refined to result in a final recommended configuration. Good landing performance, compatible with Category 3 operation into STOL runways, was obtained. Author

VOLUME 20 NUMBER 19 OCTOBER 8, 1982

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N82-28243*# Lockheed-California Co., Burbank.
ELECTRONIC/ELECTRIC TECHNOLOGY BENEFITS STUDY Report, Aug. 1980 - Jan. 1982
W. W. Howison and M. J. Cronin May 1982 226 p
(Contract NAS1-16199)
(NASA-CR-165890; NAS 1.26:165890; LR-30079) Avail: NTIS HC A11/MF A01 CSCL 01B

The benefits and payoffs of advanced electronic/electric technologies were investigated for three types of aircraft. The technologies, evaluated in each of the three airplanes, included advanced flight controls, advanced secondary power, advanced avionic complements, new cockpit displays, and advanced air traffic control techniques. For the advanced flight controls, the near term considered relaxed static stability (RSS) with mechanical backup. The far term considered an advanced fly by wire system for a longitudinally unstable airplane. In the case of the secondary power systems, trades were made in two steps: in the near term, engine bleed was eliminated; in the far term bleed air, air plus hydraulics were eliminated. Using three commercial aircraft, in the 150, 350, and 700 passenger range, the technology value and pay-offs were quantified, with emphasis on the fiscal benefits. Weight reductions deriving from fuel saving and other system improvements were identified and the weight savings were cycled for their impact on TOGW (takeoff gross weight) and upon the performance of the airframes/engines. Maintenance, reliability, and logistic support were the other criteria. Author

N82-28244# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
GENERAL AVIATION ACTIVITY AND AVIONICS SURVEY Annual Report
Judith C. Schwenk Dec. 1981 205 p refs
(AD-A112924; FAA-MS-81-5) Avail: NTIS HC A10/MF A01 CSCL 01/2

This report presents the results and a description of the 1980 General Aviation Activity and Avionics Survey. The survey was conducted during 1981 by the FAA to obtain information on the activity and avionics of the United States registered general aviation aircraft fleet, the dominant component of civil aviation in the U.S. The survey was based on statistically selected sample of about 14.0 percent of the general aviation fleet and obtained a response rate of 65 percent. Survey results are based upon responses but are expanded upward to represent the total population. Survey results revealed that during 1980 an estimated 41.0 million hours of flying time were logged by the 211,045 active general aviation aircraft in the U.S. fleet, yielding a mean annual flight time per aircraft of 190.5 hours. The active aircraft represented about 83 percent of the registered general aviation fleet. The report contains breakdowns of these and other statistics by manufacturer/model group, aircraft type, state and region of based aircraft, and primary use. Also included are fuel consumption, lifetime airframe hours, avionics, and engine hours estimates. Author (GRA)

N82-28245# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
INTERNATIONAL AVIATION (SELECTED ARTICLES)
12 Apr. 1982 23 p Transl. into ENGLISH from Guoji Hangkong (Communist China), no. 224, Oct. 1981 p 2-9, 49
(AD-A114422; FTD-ID(RS)T-0027-82) Avail: NTIS HC A02/MF A01 CSCL 21/5

Chinese made goods were exhibited, including aeronautical forgings, castings, forging dies, casting molds, powder metallurgical products, and titanium alloys and products. These goods symbolize China's production capability and technical level of aeronautical forgings and castings, with excellent qualities of these products. S.L.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

N82-28246*# Polytechnic Inst. of New York, Farmingdale.
CALCULATION OF THREE-DIMENSIONAL, INVISCID SUPERSONIC, STEADY FLOWS Final Report
Gino Moretti Washington NASA Jun. 1982 122 p refs
(Grant NsG-1248)
(NASA-CR-3573; NAS 1.26:3573) Avail: NTIS HC A06/MF A01 CSCL 01A

A numerical technique is described for the calculation of three dimensional, inviscid, supersonic, steady flows over wing-body configurations. A high degree of accuracy without increasing the number of computational nodes is obtained by means of a powerful conformal mapping technique. Results are presented for some simple body configurations and for a more complex arrow wing airframe. The numerical results show good agreement with experimental measurements. M.G.

N82-28247*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPUTER PROGRAM FOR CALCULATING FULL POTENTIAL TRANSONIC, QUASI-THREE-DIMENSIONAL FLOW THROUGH A ROTATING TURBOMACHINERY BLADE ROW
Charles A. Farrell Jun. 1982 57 p refs
(NASA-TP-2030; E-1013; NAS 1.60:2030) Avail: NTIS HC A04/MF A01 CSCL 01A

A fast, reliable computer code is described for calculating the flow field about a cascade of arbitrary two dimensional airfoils. The method approximates the three dimensional flow in a turbomachinery blade row by correcting for stream tube convergence and radius change in the throughflow direction. A fully conservative solution of the full potential equation is combined with the finite volume technique on a body-fitted periodic mesh, with an artificial density imposed in the transonic region to insure stability and the capture of shock waves. The instructions required

to set up and use the code are included. The name of the code is QSONIC. A numerical example is also given to illustrate the output of the program. M.G.

N82-28248*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INFLUENCE OF SURFACE STATIC-PRESSURE ORIFICES ON BOUNDARY-LAYER TRANSITION
Dan M. Somers, John P. Stack, and William D. Harvey Jul. 1982 33 p
(NASA-TM-84492; L-15109; NAS 1.15:84492) Avail: NTIS HC A03/MF A01 CSCL 01A

An investigation of the interaction of a laminar boundary layer and surface static-pressure orifices was conducted on a natural laminar flow airfoil. The effects of both favorable and adverse pressure gradients were studied at Reynolds numbers based on airfoil chord from approximately 500,000 to 6,000,000 with Mach number varying accordingly from about 0.03 to 0.42. The smaller the diameter of the orifice, the less likely it will cause premature transition. Locating the orifices in a chord-wise row aligned with the flow appears to have an additive, adverse effect on transition. Tube length-to-orifice diameter ration does not seem to have a consistent influence on transition. T.M.

N82-28249*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A SUMMARY OF V/STOL INLET ANALYSIS METHODS
Danny P. Hwang and John M. Abbott 1982 17 p refs To be presented at the 13th Congr. of the Intern. Council of the Aeronautical Sci. and Aircraft Systems and Technol. Conf., Seattle, 22-27 Aug. 1982; sponsored by the American Inst. of Aeronautics and Astronautics Previously announced in IAA as A82-16902
(NASA-TM-82885; E-1263; NAS 1.15:82885) Avail: NTIS HC A02/MF A01 CSCL 01A

For abstract see A82-16902

N82-28250*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMPARISON OF LASER ANEMOMETER MEASUREMENTS AND THEORY IN AN ANNULAR TURBINE CASCADE WITH EXPERIMENTAL ACCURACY DETERMINED BY PARAMETER ESTIMATION
Louis J. Goldman and Richard G. Seasholtz 1982 15 p refs Proposed for presentation at Symp. on Engr. Appl. of Laser Velocitmetry, Phoenix, Ariz., 14-19 Nov. 1982; sponsored by ASME
(NASA-TM-82860; E-1228; NAS 1.15:82860) Avail: NTIS HC A02/MF A01 CSCL 01A

Experimental measurements of the velocity components in the blade to blade (axial tangential) plane were obtained with an axial flow turbine stator passage and were compared with calculations from three turbomachinery computer programs. The theoretical results were calculated from a quasi three dimensional inviscid code, a three dimensional inviscid code, and a three dimensional viscous code. Parameter estimation techniques and a particle dynamics calculation were used to assess the accuracy of the laser measurements, which allow a rational basis for comparison of the experimenal and theoretical results. The general agreement of the experimental data with the results from the two inviscid computer codes indicates the usefulness of these calculation procedures for turbomachinery blading. The comparison with the viscous code, while generally reasonable, was not as good as for the inviscid codes. S.L.

N82-28251*# Missouri Univ., Rolla.
VISCOUS EFFECT ON AIRFOILS FOR UNSTEADY TRANSONIC FLOWS Final Report
Shen C. Lee Jun. 1982 39 p refs
(Contract NCA2-OR450-001)
(NASA-CR-166335; NAS 1.26:166335) Avail: NTIS HC A03/MF A01 CSCL 01A

The viscous effect on aerodynamic performance of an arbitrary airfoil executing low frequency maneuvers during transonic flight was investigated. The small disturbance code, LTRAN2, was modified by using a conventional integral method, BLAYER, for the boundary layer and an empirical relation, viscous wedge, for simulating the suddenly thickened boundary layer behind the shock. Before the shock, only the boundary layer displacement thickness was evaluated. After the shock, the empirical wedge thickness was superimposed on the boundary layer thickness along the surface as well as in the wake region. The pressure coefficients were calculated for both steady and unsteady states. The viscous solution takes fewer iterations to obtain the converged steady state solution. Comparisons made with experimental data and the inviscid solution show that the viscous solution agrees better with the experimental data with about the same (or slightly less) amount of computational time. A.R.H.

N82-28252*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AERODYNAMIC INTERACTIONS BETWEEN A 1/6 SCALE HELICOPTER ROTOR AND A BODY OF REVOLUTION
Mark D. Betzina and Patrick Shinoda Jun. 1982 15 p refs Prepared in cooperation with Army Research and Technology Labs., Moffett Field, Calif.
(NASA-TM-84247; A-8940; NAS 1.15:84247) Avail: NTIS HC A02/MF A01 CSCL 01A

A wind-tunnel investigation was conducted in which independent, steady state aerodynamic forces and moments were measured on a 2.24-m-diam, two bladed helicopter rotor and a body of revolution. The objective was to determine the interaction of the body on the rotor performance and the effect of the rotor on the body aerodynamics for variations in velocity, thrust, tip-path-plane angle of attack, body angle of attack, rotor/body position, and body nose geometry. Results show that a body of revolution near the rotor can produce significant favorable or unfavorable effects on rotor performance, depending on the operating condition. Body longitudinal aerodynamic characteristics are significantly modified by the presence of an operating rotor and hub. Author

N82-28253*# Universities Space Research Association, Columbia, Md.
FAST GENERATION OF THREE-DIMENSIONAL COMPUTATIONAL BOUNDARY-CONFORMING PERIODIC GRIDS OF C-TYPE Final Report
Djordje S. Dulikravich Jun. 1982 30 p refs Presented at Symp. on Numerical Generation of Curviliner Coordinating Systems and Use in Numerical Solution of Partial Differential Equations, Nashville, 13-16 Apr. 1982
(Contract NAS3-22532)
(NASA-CR-165596; NAS 1.26:165596) Avail: NTIS HC A03/MF A01 CSCL 01A

A fast computer program, GRID3C, was developed to generate multilevel three dimensional, C type, periodic, boundary conforming grids for the calculation of realistic turbomachinery and propeller flow fields. The technique is based on two analytic functions that conformally map a cascade of semi-infinite slits to a cascade of doubly infinite strips on different Riemann sheets. Up to four consecutively refined three dimensional grids are automatically generated and permanently stored on four different computer tapes. Grid nonorthogonality is introduced by a separate coordinate shearing and stretching performed in each of three coordinate directions. The grids are easily clustered closer to the blade surface, the trailing and leading edges and the hub or shroud regions by changing appropriate input parameters. Hub and duct (or outer free boundary) have different axisymmetric shapes. A vortex sheet of arbitrary thickness emanating smoothly from the blade trailing edge is generated automatically by GRID3C. Blade cross sectional shape, chord length, twist angle, sweep angle, and dihedral angle can vary in an arbitrary smooth fashion in the spanwise direction. S.L.

N82-28254 Royal Aircraft Establishment, Farnborough (England).
THE ATTACHED FLOW OVER A SLENDER DELTA WING WITH LEADING-EDGE FLAPS
A. J. Peace (East Anglia Univ., Norwich, England) 4 Jan. 1982 37 p refs
(RAE-TR-81150; RAE-Aero-3519; BR82792) Copyright. Avail: NTIS HC A03/MF A01

Flow over a delta wing with leading edge flaps is considered within the framework of slender body theory. In order to avoid flow separation at the leading edges of the flaps, a Kutta condition is applied which uniquely determines the angle of attack for a given flap configuration. The lift coefficient and lift dependent drag factor are then calculated for this condition and

are compared with the prediction of slender thin wing theory, in which the wing boundary condition is fully linearized. Increasing the angle of deflection, in the cross flow plane, above 90 deg increases the angle of incidence for attachment, and increases the lift coefficient at attachment. Lift at attachment is predicted with < 5% error accuracy for deflection angles < 75 deg by the linear theory, for hinge lines at 70%, 80% and 90% of the semispan. Largest lift coefficients at attachment are produced with the hinge-line near 80% of the semispan, but degradation at 70% and 90% is small. Author (ESA)

N82-28255# Naval Postgraduate School, Monterey, Calif.
AIRBORNE LASER TURRET FLOW CONTROL: A PARAMETRIC STUDY OF WIND TUNNEL MODEL CONDITIONS M.S. Thesis
David Allen Rippel Dec. 1981 143 p refs Sponsored in part by AFWL
(AD-A113557; NPS67-81-015) Avail: NTIS HC A07/MF A01 CSCL 19/6

Wind tunnel tests were conducted on a one-third scale model of the USAF NKC-135 airborne laser turret and aerodynamic fairing. The model was constructed so that six main parameters could be varied as follows: fairing nosepieces, fuselage bleed slot position and condition (porous/non-porous), suction duct throttle position, blower suction throttle position, and the turret-fairing gap. The method of flow control employed to produce quiescent air flow about the turret was that of fuselage boundary layer and after-body fairing suction. Results of the extensive testing indicate that the method is viable for low velocity, incompressible air flow. Additionally, optimum conditions (i.e., minimum suction required and the best combination of other parameters necessary to provide quiescent flow) were determined. Author (GRA)

N82-28256# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
AN INVESTIGATION OF THE FLOW ABOUT AN OGIVE CYLINDER AT HIGH ANGLES OF INCIDENCE Final Scientific Report, 1 Feb. 1981 - 31 Jan. 1982
Bernard P. Paul and E. Wedemeyer Mar. 1982 178 p refs
(Grant AF-AFOSR-0118-81; AF Proj. 2301)
(AD-A113356; EOARD-TR-82-7) Avail: NTIS HC A09/MF A01 CSCL 20/4

The present work gives the results of flow visualization studies and six component force measurements on an ogive cylinder body at high angles of attack in the sub and transonic flow regime. High angle of attack aerodynamic investigations had not been done before at the VKI, so a new wind tunnel model support system, six component force balance and water tunnel contraction and test section were designed and constructed to enable the present investigation to be performed. Force measurements and flow visualization studies were carried out on both a sharp nosed body and a blunt nosed body of (l/d)TOT = 18 and 17.4, respectively. The side force induced by the asymmetric vortex pattern which develops on the leeward side of an ogive cylinder was the primary focus of this investigation. A detailed review of previous investigations was performed. The results obtained in this investigation were found to agree quite well with previous results. The flow visualization studies were carried out in the VKI WT-1 water tunnel and the force measurements in the VKI S-1 transonic-supersonic wind tunnel. GRA

N82-28257# Weapons Systems Research Lab., Adelaide (Australia).
COMPUTATIONAL AERODYNAMICS AT WEAPONS SYSTEMS RESEARCH LABORATORY
L. M. Sheppard Oct. 1981 13 p refs
(AD-A112867; WSRL-0236-TM) Avail: NTIS HC A02/MF A01 CSCL 20/4

A review is given of the computer-related aerodynamic research carried out at Weapons Systems Research Laboratory over the past twenty years or so. During this period, three main digital computers have been in use, namely WREDAC, IBM 7090 and IBM 370. A notable peak in research activity occurred during 1975 to 1978 when the task Fluid Dynamics - Computing was in existence and the IBM 370 computer was available. This task has since been terminated. Potential applications of computational aerodynamics at Weapons Systems Research Laboratory extend to unguided bombs, bomblets, bullets, mortars, rockets and shells, as well as terminally corrected precision-guided weapons, gliding munitions, guided missiles, release of external stores from aircraft and carriage of external stores on aircraft. Author (GRA)

N82-28258# Ballistic Research Labs., Aberdeen Proving Ground, Md.
SURFACE PRESSURE MEASUREMENTS ON A BOAT-TAILED PROJECTILE SHAPE AT TRANSONIC SPEEDS Final Report
L. D. Kayser and F. Whiton Mar. 1982 85 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A113520; AD-F300025; ARBRL-MR-03161) Avail: NTIS HC A05/MF A01 CSCL 19/1

Measurements of wall static pressures on a model with and without a boattail are reported. The model shape is similar to that of M549 projectile geometry. Data were acquired at Mach numbers of 0.91, 0.94, 0.96, 0.98, 1.10, and 1.20; angles of attack of 0, 2, 4, 6, and 10 degrees; and circumferential positions around the model in 22.5 degree increments. Some of the pressure data were integrated over the model to provide axial force and static stability coefficients. Results are presented in both graphical and tabulated form and some comparisons are made with computational results. GRA

N82-28259# Tufts Univ., Medford, Mass. Dept. of Electrical Engineering.
POINTING PAYLOAD FOR SINGLE TETHER BALLOONS AND OTHER PROJECTS Final Report, 1 Feb. 1980 - 31 Jan. 1982
Alvin H. Howell 26 Feb. 1982 18 p
(Contract F19628-80-C-0060; AF Proj. 7659)
(AD-A114447; AFGL-TR-82-0077) Avail: NTIS HC A02/MF A01 CSCL 01/3

A two-axis, pointing-type payload has been built that can be flown at Hollman Air Force Base on currently available balloons, using launch facilities and launch methods now being employed there. When attached to the flying lines of an aerodynamically shaped ballon it will point toward a target light on the ground in a daylight operation with a precision of + or - 0.75 deg when elevated to 10,000 feet. Heading of the payload axis is commandable from the ground, and target acquisition is aided by a search feature. The system was successfully tested in September 1981 while carrying a hitchhike experiment that measured IR transmission through the atmosphere. Other work accomplished under the contract included the assembly and modification of four smart valves, the fabrication of five Tufts-type payload releases for use by AFGL, assembling the facts and analyzing the probable reason why an insulating tether failed in Germany with a load of only 3 per cent of the breaking strength of the cable, and studying the problems involved in stabilizing two six-foot dish-type antennas held at the apex of a four-tether balloon arrangement. GRA

N82-28260# Systems Research Labs., Inc., Dayton, Ohio.
WIND-TUNNEL EVALUATION OF AN AEROELASTICALLY CONFORMABLE ROTOR Final Report
Lawrence R. Sutton, Richard P. White, Jr., and Robert L. Marker Mar. 1982 87 p refs
(DA Proj. 1L2-62209-AH-76)
(AD-A114384; USAAVRADCOM-TR-81-D-43) Avail: NTIS HC A05/MF A01 CSCL 01/3

This report summarizes the theoretical and experimental investigations that were conducted to evaluate the potential of aeroelastic and mass-elastic couplings in an aerolastic conformable rotor (ACR) that will improve the performance and vibratory characteristics of helicopter rotor systems without creating instabilities. ACR parameters were identified and a baseline rotor system was selected. An ACR blade concept was investigated by altering the characteristics of the baseline and using automated analysis techniques. GRA

N82-28261# Army Aviation Research and Development Command, St. Louis, Mo. Applied Technology Lab.
NATIONAL TRANSONIC FACILITY (NTF) PROTOTYPE FAN BLADE FATIGUE TEST Progress Report, Jan. - Mar. 1981
E. H. Dean, A. J. Gustafson, and D. M. Saylor Mar. 1982 18 p

(DA Proj. 1L1-62209-AH-76)
(AD-A114405; USAAVRADCOM-TR-82-D-5) Avail: NTIS HC A02/MF A01 CSCL 14/2

The Applied Technology Laboratory conducted fatigue tests on a composite fan blade designed for use in the new NTF wind tunnel being constructed at NASA-Langley. The tests were performed by the Structures Technical Area using the root end fatigue machine (REFM), which was modified for ground-air-ground testing. Simulated centrifugal and aerodynamic (bending) load tests were performed. The fan blade successfully withstood 6000 cycles at 360 rpm and 600 rpm load conditions for the cyclic rate tests. These tests simulated the starting and stopping cycles of the fan. Static load tests to 57,000 pounds design load were also successfully performed on the blade specimen.
Author (GRA)

N82-28262# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
EVALUATION OF AN EXPERIMENTAL TECHNIQUE TO INVESTIGATE THE EFFECTS OF THE ENGINE POSITION ON ENGINE/PYLON/WING INTERFERENCE
J. A. J. vanEngelen, B. Munniksma, and A. Elsenaar 28 Apr. 1981 16 p refs Presented at AGARD Symp. on Aerodyn. of Power Plant Installation, Toulouse, 11-14 May 1981
(NLR-MP-81020-U) Avail: NTIS HC A02/MF A01

Free flow and blown nacelle wind tunnel testing of engine-airframe integration are compared, and the magnitude of the parasitic interference of an additional strut and engine inlet fairing is examined. A semispan model, typical of a transport aircraft with a supercritical wing was tested. A 3/4 fan cowl high bypass engine was located at six positions underneath the wing. Measurements included pressure and balance force. It is shown that while accurate simulation of engine nozzle geometry is of prime importance, tests on free flow nacelles are useful for selecting engine position. Interference forces derived from pressure integration are only useful for determining trends in interference effects for flexible initial tests. Author (ESA)

N82-28263# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
A FINITE DIFFERENCE METHOD FOR THE CALCULATION OF TRANSONIC FLOW ABOUT A WING, BASED ON SMALL PERTURBATION THEORY
J. vanderVooren, G. H. Huizing, and A. vanEssen 5 Mar. 1981 103 p refs
(Contract NIVR-1739)
(NLR-TR-81031-U) Avail: NTIS HC A06/MF A01

A calculation method for the transonic flow about a semiwing based on transonic small perturbation theory, is presented. The influence of a body can be simulated by prescribing appropriate transverse velocities in a vertical plane through the wing root. The wing should be thin and have little dihedral, camber, and twist and a not too blunt leading edge. The body should be slender. The angle of incidence must be small. However, highly swept wings are allowed. A fully finite difference scheme is implemented for a correct shock capture. Line relaxation is used to solve the corresponding nonlinear equations. It is indicated that too much artificial viscosity leads to an unrepresentative calculation, and too little can lead to instabilities. Author (ESA)

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

N82-28264# General Accounting Office, Washington, D. C. Accounting and Financial Management Div.
COMPUTER OUTAGES AT AIR TERMINAL FACILITIES AND THEIR CORRELATION TO NEAR MISS MID-AIR COLLISIONS (AFMD-82-43)
16 Feb. 1982 17 p refs
(B-206064) HC A02/MF A01

The frequency of computer failures at terminal facilities and the extent of correlation between these failures and near mid-air collisions were investigated in a survey of nine terminal facilities. No direct correlation between the computer outages and reported mid-air collisions or the safety related incidents was found.
R.J.F.

N82-28265# Aeronautical Research Labs., Melbourne (Australia).
A STUDY OF WIND SHEAR EFFECTS ON AIRCRAFT OPERATIONS AND SAFETY IN AUSTRALIA
K. W. Anderson and B. A. J. Clark Mar. 1981 84 p refs
(ARL-Sys-Rept-24; AR-002-271) Avail: NTIS HC A05/MF A01

The ergonomics aspects of aircraft operation in conditions of local variations of wind were studied. Questionnaires were analyzed for subject understanding, detection of wind difficulties, frequency of wind shear and downdraft situations, pilot techniques, and forewarning methods. Pilots often found terrain-induced downdrafts and thunderstorm wind shears troublesome. Operations in irregular terrain away from major aerodromes were frequently cited for wind shear hazards. Pilot judgements on the most susceptible aircraft types were not readily explicable in terms of size, landing speed or wing loading. Pilots and ATCs indicated that currently used cues in wind shear conditions include visual estimates of glideslope departures, precision approach radar observations and aircraft-based measurements of wind or ground speed. Ground-based remote sensing equipment for detecting stable wind shear is considered. A synopsis of wind-involved airliner crashes and a summary of meteorological conditions for the occurrence of local wind variations are included. Author

N82-28266*# Villanova U., Pa.
GUST RESPONSE OF COMMERCIAL JET AIRCRAFT INCLUDING EFFECTS OF AUTOPILOT OPERATION Final Report
Joseph H. Goldberg Jun. 1982 125 p refs
(Contract NAS1-16095)
(NASA-CR-165919) Avail: NTIS HC A06/MF A01 CSCL 01C

A simplified theory of aircraft vertical acceleration gust response based on a model including pitch, vertical displacement and control motions due to autopilot operation is presented. High-order autopilot transfer functions are utilized for improved accuracy in the determination of the overall response characteristics. Four representative commercial jet aircraft were studied over a wide range of operating conditions and comparisons of individual responses are given. It is shown that autopilot operation relative to the controls fixed case causes response attenuation of from 10 percent to approximately 25 percent depending on flight condition and increases in crossing number up to 30 percent, with variations between aircraft of from 5 percent to 10 percent, in general, reflecting the differences in autopilot design. A detailed computer program description and listing of the calculation procedure suitable for the general application of the theory to any airplane autopilot combination is also included. Author

N82-28267# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Biomechanical Protection Branch.
COMPARATIVE VERTICAL IMPACT TESTING OF THE F/FB-111 CREW RESTRAINT SYSTEM AND A PROPOSED MODIFICATION
Bernard F. Hearon, James W. Brinkley, James H. Raddin, Jr., Lawrence A. McGowan, and Joseph M. Powers Mar. 1982 312 p refs
(AF Proj. 7231)
(AD-A113957; AFAMRL-TR-82-13) Avail: NTIS HC A13/MF A01 CSCL 01/3

An impact test program was conducted to evaluate the operational F/FB-111 crew seat and restraint system and a proposed modification. A primary objective of the program was to compare human response to vertical impacts in the two restraint harnessess. A total of 67 human impact tests were performed on the Vertical Deceleration Tower up to 10 G peak, 26 ft/sec. Subjects were exposed to comparable impacts at different seat elevations in both harnesses to allow parametric analysis of the test results. Measured data included seat acceleration and velocity,

head and chest translational acceleration components, triaxial forces acting on the seat and footrest, forces acting at the restraint harness, attachment, and deplacements of various body segments. The resultant head and chest accelerations were significantly greater in the modified harness than in the operational harness, regardless of seat elevation. On the basis of this comparison, the proposed modification to the F/FB-111 crew seat and restraint is not recommended for implementation. Future restraint harness modification proposals should be based on careful evaluation of all unconventional design features of the operational harness and should address all mechanisms by which adverse loads may be imposed on the seat occupant. In addition, future redesign efforts of the F/FB-111 escape system should provide improved landing impact attenuation. GRA

N82-28268# Air Force Engineering and Services Center, Tyndall AFB, Fla. Engineering and Services Lab.
SMOKE ABATEMENT SYSTEM FOR CRASH RESCUE/FIRE TRAINING FACILITIES Final Report, Sep. 1979 - Sep. 1981
Anthony J. Kwan and John A. Hamre Sep. 1981 33 p
(AF Proj. 2505)
(AD-A114380; AFESC/ESL-TR-81-43) Avail: NTIS HC A03/MF A01 CSCL 13/2

This report provides the design for a smoke-abated aircraft crash/rescue trainer. The design is for a 75-ft diameter fire area suitable for operation in freezing and nonfreezing climates. With this system liquid petroleum fuels can be burned with little or no smoke by injecting a fine water spray near the surface of the burning fuel. This method of smoke abatement is being applied at military fire fighting training facilities. The report includes all equipment necessary for the smoke abatement function and provides detailed step-by-step operating procedures.
Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications*.

N82-28269*# Analytical Mechanics Associates, Inc., Hampton, Va.
TERMINAL AREA AUTOMATIC NAVIGATION, GUIDANCE, AND CONTROL RESEARCH USING THE MICROWAVE LANDING SYSTEM (MLS). PART 4: TRANSITION PATH RECONSTRUCTION ALONG A STRAIGHT LINE PATH CONTAINING A GLIDESLOPE CHANGE WAYPOINT Final Report
Samuel Pines Washington NASA Jun. 1982 40 p refs
(Contract NAS1-15116)
(NASA-CR-3574-Pt-4; NAS 1.26:3574; AMA-81-37) Avail: NTIS HC A03/MF A01 CSCL 17G

The necessary algorithms to reconstruct the glideslope change waypoint along a straight line in the event the aircraft encounters a valid MLS update and transition in the terminal approach area are presented. Results of a simulation of the Langley B737 aircraft utilizing these algorithms are presented. The method is shown to reconstruct the necessary flight path during MLS transition resulting in zero cross track error, zero track angle error, and zero altitude error, thus requiring minimal aircraft response. T.M.

N82-28270# Radio Technical Commission for Aeronautics, Washington, D. C.
MINIMUM OPERATIONAL PERFORMANCE STANDARDS FOR AUTOMATIC DIRECTION FINDING (ADF) EQUIPMENT
13 May 1982 53 p Supersedes RTCA/DO-137
(RTCA/DO-179; RTCA/DO-137) Avail: NTIS HC A04/MF A01

Minimum operational performance standards are set forth for automatic direction finding equipment. Incorporated in these standards are system characteristics that will benefit users of the system as well as designers, manufacturers, and installers. Compliance with these standards is recommended as a means of assuring that the equipment will satisfactorily perform its intended function under all conditions normally encountered.
L.F.M.

N82-28271# Eclectech Associates, Inc., North Stonington, Conn.
AIDS TO NAVIGATION PRINCIPAL FINDINGS ON THE CAORF EXPERIMENT. THE PERFORMANCE OF VISUAL AIDS TO NAVIGATION AS EVALUATED BY SIMULATION Interim Report
M. W. Smith and W. R. Bertsche Feb. 1981 170 p refs
(Grant DOT-CG-835285-A)
(AD-A107045; EA-80-U-051; USCG-D-51-81) Avail: NTIS HC A08/MF A01 CSCL 17/7

The experiment described in the present report is the first of a series done for the U.S. Coast Guard to quantify the relationship between variables related to aids to navigation and piloting performance in narrow channels, and, therefore, safety in such channels. The present experiment was restricted to visual piloting, and, further, to buoys only. It was done at CAORF, the Maritime Administration's Computer Aided Operations Research Facility in Kings Point, New York. The variables evaluated were: straight channel marking (staggered versus gated buoys), spacing (5/8 versus 1-1/4 nm), turnmarking (one versus three buoys), day/night, detection range (3/4 versus 1-1/2 nm), angle of turn (15 versus 35 degrees), and turn radius (noncutoff versus cutoff). A scenario was planned to include both trackkeeping and maneuvering tasks done both with and without perturbation. The findings are presented as the means and standard deviations of the crosstrack position of transits under each condition. They are interpreted in terms of their implications both for channel design and for an understanding of the piloting process.
Author (GRA)

N82-28272# Singer Co., Fairfield, N. J.
NEW SENSOR CONCEPTS: LOW COST VIBRATING BEAM ACCELEROMETER Final Report, Sep. 1980 - Sep. 1981
W. C. Albert Wright-Patterson AFB, Ohio AFWAL Dec. 1981 110 p refs
(Contract F33615-80-C-1218; AF Proj. 6095)
(AD-A113644; KD-81-27; AFWAL-TR-81-1229) Avail: NTIS HC A06/MF A01 CSCL 17/7

Engineering model accelerometers have been assembled and tested to assess their potential for use in future strapped down inertial systems. The accelerometer concept investigated uses vibrating quartz crystal beams as the basic force sensing element. This concept has an inherent digital output and the potential for meeting the performance goals of bias stability of less than 100ug, scale factor stability less than 100ppm, input range at least 10g, bias temperature sensitivity on the order of lug/deg C and scale factor temperature sensitivity on the order of lppm/deg C. The accelerometer mechanization utilizes two force sensing crystals in a push pull arrangement to enhance the scale factor and cancel non-linear and thermal effects. Test, data on engineering units is presented and recommendations for future development tasks are made. Author (GRA)

N82-28273# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
MATERIALS RESEARCH FOR ADVANCED INERTIAL INSTRUMENTATION. TASK 1: DIMENSIONAL STABILITY OF GYROSCOPE STRUCTURAL MATERIALS Research Report, 1 Oct. 1980 - 30 Sep. 1981
K. Kumar, F. Petri, and J. Wollam Dec. 1981 48 p refs
(Contract N00014-77-C-0388)
(AD-A113497; R-1527; TR-4) Avail: NTIS HC A03/MF A01 CSCL 17/7

Macroyield experiments were performed on HIP-50 beryllium samples. These samples have been investigated for their microyield behavior during the last reporting period. Micro- as well as macroyield experiments were also performed on as-received and heat treated samples of the X-520 grade of beryllium and these results were compared with those obtained on HIP-50. Significant differences were observed for these two beryllium grades with respect to their 'micro' properties, even though their 'macro'

properties were quite comparable. The microyield strength (MYS) values for as-received and heat treated HIP-50 samples were in the range of 17 to 27 kpsi; those for similarly heat treated X-520 samples, however, ranged only from about 8 to 9 kpsi. GRA

N82-28274# Arinc Research Corp., Annapolis, Md.
COST ANALYSIS OF THE DISCRETE ADDRESS BEACON SYSTEM FOR THE LOW-PERFORMANCE GENERAL AVIATION AIRCRAFT COMMUNITY Final Report
S. Kowalski, K. Peter, A. Schust, D. Swann, and P. Young Sep. 1981 364 p
(Contract DOT-FA76WA-3788)
(AD-A112957; Rept-1326-01-15-2529; FAA-RD-81-61) Avail: NTIS HC A16/MF A01 CSCL 17/7

This report presents the results of cost analysis of various Discrete Address Beacon System (DABS) configurations that may be implemented for the low-performance general aviation aircraft community. The DABS designs considered in this analysis were developed by ARINC Research Corporation using state-of-the-art technology. GRA

N82-28275# Arinc Research Corp., Annapolis, Md.
EVALUATION OF VARIOUS NAVIGATION SYSTEM CONCEPTS
L. Hogle, K. Markin, and S. Toth Mar. 1982 169 p refs
(Contract DTFA01-80-C-10030)
(AD-A112919; Rept-1378-01-3-2652; FAA-EM-82-15) Avail: NTIS HC A08/MF A01 CSCL 17/7

The purpose of this study is to identify the capabilities and limitations of a particular set of navigation systems and evaluate their performance in the current airspace environment. The navigation systems evaluated are Loran-C, Omega, VHF Omnidirectional Range/Distance Measuring Equipment (VOR/DME), Global Positioning System (GPS), Doppler navigation system, and inertial navigation system (INS). In addition to detailed technical and operational analyses of each navigation system, consideration is also given to the constraints imposed by and the deficiencies existing in the standards by which accuracy and effectiveness of navigation systems are measured. Author (GRA)

N82-28276# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
IMPROVED 243 MHz HOMING ANTENNA SYSTEM FOR USE ON HELICOPTERS
F. Klinker 23 Apr. 1981 24 p refs Presented at Intern. IEEE/AP-s Symp., Los Angeles, 16-19 Jun. 1981
(NLR-MP-81022-U) Avail: NTIS HC A02/MF A01

The principles of azimuthal homing systems used in SAR search and rescue helicopters are outlined. In current SAR systems the homing signal is represented by the intersection of the radiation from two vertical dipoles. Intersections at 0 and 180 deg with respect to a center line are desired, but those at 120, 140, and 200 deg must be eliminated. Pattern distortion, which results in spurious intersections, is caused by mutual coupling between antennas, electromagnetic interaction coupling through the beam forming network, and attenuation and reflection of the received signal by the helicopter fuselage. The design uses reflectors on the antennas to reduce fuselage influence, and increases separation between radiation patterns to prevent intersections arising from mutual coupling. No homing ambiguities are reported in flight tests of a helicopter using the redesigned system. Author (ESA)

N82-28277# National Transportation Safety Board, Washington, D. C. Bureau of Accident Investigation.
SPECIAL INVESTIGATION REPORT: AIR TRAFFIC CONTROL SYSTEM
8 Dec. 1981 60 p
(PB82-136276; NTSB-SIR-81-7) Avail: NTIS HC A04/MF A01 CSCL 05A

The air traffic control system was investigated following a strike of the air traffic controllers which resulted in the walkout of about 11,400 of the 17,275 controller workforce. The investigation included an analysis of ATC data, the ability of the FAA to meet staffing requirements, the qualifications of the controller workforce, training for new controllers, the effect of stress and fatigue, facility supervision and management, the control of the capacity of the system, and computer and equipment reliability. No basic ATC procedures were changed or compromised in order to keep the ATC system in operation, and the high level of ATC safety required is possible within the present system. GRA

N82-28278*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLIGHT EVALUATION OF LORAN-C IN THE STATE OF VERMONT Final Report, Jul. 1979 - May 1981
F. D. Mackenzie (Transportation Systems Center, Cambridge, Mass.) and C. D. Lytle Sep. 1981 162 p refs
(NASA-TM-84711; NAS 1.15:84711; PB82-138603; DOT-TSC-RSPA-81-10) Avail: NTIS HC A08/MF A01 CSCL 17G

A flight evaluation of LORAN C as a supplement to existing navigation aids for general aviation aircraft, particularly in mountainous regions of the United States and where VOR coverage is limited was conducted. Flights, initiated in the summer months, extend through four seasons and practically all weather conditions typical of northeastern U.S. operations. Assessment of all the data available indicates that LORAN C signals are suitable as a means of navigation during enroute, terminal and nonprecision approach operations and the performance exceeds the minimum accuracy criteria. GRA

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N82-28279* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MEANS FOR CONTROLLING AERODYNAMICALLY INDUCED TWIST Patent
Wolf Elber, inventor (to NASA) Issued 18 May 1982 4 p Filed 28 Sep. 1979 Supersedes N80-16055 (18 - 07, p 0821)
(NASA-Case-LAR-12175-1; US-Patent-4,330,100; US-Patent-Appl-SN-079913; US-Patent-Class-244-48) Avail: US Patent and Trademark Office CSCL 01C

A control mechanism which provides active compensation for aerodynamically induced twist deformation of high aspect ratio wings consists of a torque tube, internal to each wing and rigidly attached near the tip of each wing, which is moved by an actuator located in the aircraft fuselage. As changes in the aerodynamic loads on the wings occur the torque tube is rotated to compensate for the induced wing twist.

Official Gazette of the U.S. Patent and Trademark Office

N82-28280*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DESIGN CONSIDERATIONS AND EXPERIENCES IN THE USE OF COMPOSITE MATERIAL FOR AN AEROELASTIC RESEARCH WING
Clinton V. Eckstrom and Charles V. Spain (Kentron International, Inc., Hampton, Va.) May 1982 11 p refs Presented at 23rd AIAA/ASME/ASCH/AHS Structures, Structural Dyn. and Mater. Conf., New Orleans, 10-12 May 1982
(NASA-TM-83291; NAS 1.15:83291; AIAA-82-0678) Avail: NTIS HC A02/MF A01 CSCL 01C

Experiences in using composite skin material on an aeroelastic research wing used in flight flutter testing are described. Significant variations in skin shear modulus due to stress and temperature were encountered with the original fiberglass laminate skin designed to minimize wing torsional stiffness. These variations along with the sensitivity of wing torsional stiffness to the skin-to-frame attachment method complicated the structural model vibration mode predictions. A wing skin redesign with different fiber orientation and a reduction in the amount of skin-to-frame bonding resulted in more predictable model characteristics without sacrificing design objectives. Design and modeling considerations for future applications are discussed. Author

N82-28281*# Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.

THE COST OF NOISE REDUCTION FOR DEPARTURE AND ARRIVAL OPERATIONS OF COMMERCIAL TILT ROTOR AIRCRAFT Contractor Final Report

Henry B. Faulkner and William M. Swan Feb. 1976 119 p refs

(Contract NAS2-7620)

(NASA-CR-137803; NAS 1.26:137803; R76-4) Avail: NTIS HC A06/MF A01 CSCL 01C

The relationship between direct operating cost (DOC) and noise annoyance due to a departure and an arrival operation was developed for commercial tilt rotor aircraft. This was accomplished by generating a series of tilt rotor aircraft designs to meet various noise goals at minimum DOC. These vehicles ranged across the spectrum of possible noise levels from completely unconstrained to the quietest vehicles that could be designed within the study ground rules. Optimization parameters were varied to find the minimum DOC. This basic variation was then extended to different aircraft sizes and technology time frames. It was concluded that reducing noise annoyance by designing for lower rotor tip speeds is a very promising avenue for future research and development. It appears that the cost of halving the annoyance compared to an unconstrained design is insignificant and the cost of halving the annoyance again is small. Author

N82-28282*# Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.

HELICOPTER VIBRATION SUPPRESSION USING SIMPLE PENDULUM ABSORBERS ON THE ROTOR BLADE Final Report

G. Alvin Pierce and M.-Nabil H. Hanouva [1982] 140 p refs (Grant NsG-1592)

(NASA-CR-169131; NAS 1.26:169131) Avail: NTIS HC A07/MF A01 CSCL 01C

A comprehensive analytical design procedure for the installation of simple pendulums on the blades of a helicopter rotor to suppress the root reactions is presented. A frequency response analysis is conducted of typical rotor blades excited by a harmonic variation of spanwise airload distributions as well as a concentrated load at the tip. The results presented included the effect of pendulum tuning on the minimization of the hub reactions. It is found that a properly designed flapping pendulum attenuates the root out-of-plane force and moment whereas the optimum designed lead-lag pendulum attenuates the root in-plane reactions. For optimum pendulum tuning the parameters to be determined are the pendulum uncoupled natural frequency, the pendulum spanwise location and its mass. It is found that the optimum pendulum frequency is in the vicinity of the excitation frequency. For the optimum pendulum a parametric study is conducted. The parameters varied include prepitch, pretwist, precone and pendulum hinge offset. Author

N82-28283# Rockwell International Corp., Cedar Rapids, Iowa.

DELTA ELECTRICAL LOAD ANALYSIS C-141B JACC/CP AIRCRAFT

G. R. Taylor 10 Mar. 1982 9 p

(Contracts F09603-80-C-0602; F09603-81-C-1953)

(AD-A113761) Avail: NTIS HC A02/MF A01 CSCL 01/3

The installation of the provisions to accept the JACC/CP Capsule in the C -141B Aircraft causes a change to the electrical loads within the present aircraft power distribution system. The purpose of this report is to furnish a tabulation of the changes to the aircraft power system caused by this installation. GRA

N82-28284# Boeing Military Airplane Development, Seattle, Wash.

ADVANCED AIRCRAFT ELECTRICAL SYSTEM CONTROL TECHNOLOGY DEMONSTRATOR. PHASE 1: ANALYSIS AND PRELIMINARY DESIGN Interim Report, 1 Mar. - 30 Sep. 1981

T. R. Boldt, G. L. Dunn, D. E. Hankins, P. J. Leong, and I. S. Mehdi Wright-Patterson AFB, Ohio AFWAL Jan. 1982 134 p refs

(Contract F33615-80-C-2004; AF Proj. 3145)

(AD-A113633; D180-25927-3; AFWAL-TR-81-2128) Avail: NTIS HC A07/MF A01 CSCL 10/2

This report summarizes Task 1-Requirements Analysis and Task 2-Conceptual Design and documents the results of Task 3, Phase I, of this two-phase program. Task 3 is the preliminary design of an advanced aircraft electrical system (AAES). The AAES is designed to meet the requirements of a 1990 time frame two-engine tactical aircraft with multi-mission capability. The AAES performs the functions of power generation, distribution and control of power to loads, system protection, and load management. Key characteristics of the AAES are: Integrated avionics and power data bus configuration consisting of Digital Avionics Information System (DAIS) standard elements (MIL-STD-1750 processor, MIL-STD-1553B data bus, controls and displays, and remote terminals (RT)). Intelligent Electrical Load Management Centers (ELMC) capable of controlling power to loads; Built-in-test (BIT) capability to isolate faults to the module level. BIT includes both circuit and data monitoring checks. Solid State Power Controllers (SSPC) to replace circuit breakers and power control switches. SSPCs are turned on/off via computer control. Generator control, protection and status monitoring by a Generator Control Unit (GCU) compatible with DAIS hardware and software. Multimission data information system through programmable system processors, ELMCs and standard DAIS elements. Automatic load management for increased aircraft survivability and probability of mission completion. GRA

N82-28285# National Research Council of Canada, Ottawa (Ontario). Flight Research Lab.

EVALUATIONS OF HELICOPTER INSTRUMENT-FLIGHT HANDLING QUALITIES

S. R. M. Sinclair and S. Kereliuk Jan. 1982 49 p refs In ENGLISH; FRENCH summary

(AD-A114004; NRCC-LR-608) Avail: NTIS HC A03/MF A01 CSCL 01/2

The NAE Airborne Simulator, a modified and suitably equipped Bell 205A helicopter, was used in experiments to provide background information on the handling qualities requirements for helicopter instrument flight. This investigation was in support of a regulatory review undertaken by the U.S. Federal Aviation Administration as part of an overall assessment of the helicopter certification process. The results illustrate the inter-dependence of the various stability and control characteristics which contribute to safe instrument flight handling qualities, and underline the importance of good mission simulation in conducting certification-related experiments. Author (GRA)

N82-28286# McDonnell Aircraft Co., St. Louis, Mo.

ADVANCED TRENDING ANALYSIS/EDS DATA PROGRAM Final Report, May 1979 - Sep. 1981

David C. Perryman Wright-Patterson AFB, Ohio AFWAL Jan. 1982 181 p refs

(Contract F33615-78-C-2070; AF Proj. 3066)

(AD-A113511; AFWAL-TR-81-2125) Avail: NTIS HC A09/MF A01 CSCL 09/2

Ground, flight, and maintenance data was collected during the F-15/F100 Engine Diagnostic System (EDS) Flight Evaluation and provided to the Air Force Aero-Propulsion Laboratory (AFWAL/POTC). This data was used by the Air Force, in a concurrent program, to verify a gas turbine engine fault detection/isolation and health trending algorithm employing gas path analysis. In addition, the EDS Flight Evaluation served as a demonstration vehicle for a prototype Maintenance Information Management System (MIMS). Independent assessments of the gas path analysis algorithm and of the prototype MIMS were performed and the results are presented. Several lessons learned about the automatic recording of in-flight trending data for high performance gas turbine engines in modern tactical aircraft are also presented. Author (GRA)

N82-28287# Ballistic Research Labs., Aberdeen Proving Ground, Md.

KINEMATIC INVESTIGATION HUGHES HELICOPTER 7.62mm CHAIN GUN

R. P. Kaste Feb. 1982 48 p refs

(DA Proj. 1L1-62617-AH-19)

(AD-A113114; AD-F300017; ARBRL-MR-03157) Avail: NTIS HC A03/MF A01 CSCL 19/6

A kinematic study of the Hughes Helicopter 7.62mm Chain Gun was performed to determine the power required to operate

the weapon and loads on the stud roller due to the various components of the weapon. Using a 24-volt battery system the gun drew up to 60 amperes to start and operated on 22 amperes. The stud roller carries a load up to 497 Newtons. GRA

N82-28288# General Dynamics/Fort Worth, Tex.
RESEARCH MODEL WING/TAIL FABRICATION Technical Report, 17 Aug. 1981 - 18 Jan. 1982
Ronald A. Cox Mar. 1982 9 p
(Contract N00014-81-C-0680)
(AD-A114101; FZA-535) Avail: NTIS HC A02/MF A01 CSCL 14/2

The design and construction of a transonic wind-tunnel model has been completed. The 1/7.5-scale model can be equipped with an all-flying low-, mid-, or T-tail. A baseline, linear element wing and an alternate wing of identical planform, but with chordwise airfoil sections optimized for transonic cruise, have been manufactured. One row of pressures is located on each wing and on the horizontal tail. Author (GRA)

N82-28289# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Directorate for Development and Qualification.
HISS CALIBRATION, ICE PHOBICS AND FAA R/D EVALUATIONS Final Report, Jan. - Mar. 1981
John C. Henderson, Ralph Woratschek, and Loran A. Haworth Aug. 1981 62 p refs
(AD-A114435; USAAEFA-80-13) Avail: NTIS HC A04/MF A01 CSCL 01/3

Artificial and natural icing tests of a JUH-1H helicopter were flown in the vicinity of St. Paul, Minnesota, during the three month period of January through March 1981. Productive flight time totaled 15.4 hours in the artificial icing environment behind the Helicopter Icing Spray System (HISS) and 3.2 hours in natural icing. Test conditions ranged from -5 C to -20 C and 0.25 to 1.0 gram per cubic meter liquid water content (LWC) for the artificial testing and -6 C to -9 C and 0.1 to 0.5 gram per cubic meter LWC for the natural testing. Tests in the artificial icing environment behind the HISS were flown to define the nature of the HISS cloud in terms of LWC, cloud particle size and distribution; and to quantitatively determine the effects of an ice phobic coating on the capability of the UH-1H to fly in icing conditions. The ice phobic coating did not significantly affect the capability of the UH-1H to fly in icing conditions. GRA

N82-28290# Army Aviation Research and Development Command, St. Louis, Mo.
HISTORICAL RESEARCH AND DEVELOPMENT INFLATION INDICES FOR ARMY FIXED AND ROTOR WINGED AIRCRAFT Annual Report
Charles W. Lines, Jr. and William J. Waymire Jan. 1982 37 p refs
(AD-A114368; USAAVRADCOM-TR-82-F-3) Avail: NTIS HC A03/MF A01 CSCL 05/1

This Technical Memorandum is a continuation of previous efforts to develop the necessary rationale and methodology needed in order to construct historical inflation indices, in the Research and Development (R&D) area, relative to Army aircraft. The R&D historical indices, and the sub-indices from which they are derived, are presented in the appendices to this report for the period FY68 through FY81. These indices are appropriate for updating statistical reports that formerly utilized the OSD forecasting indices; for initial use in bringing a cost in prior years to a present-year dollar value; and for evaluating inflation actually experienced. A computer program is utilized to make the necessary mathematical calculations. Data sources for this report were the Office of Personnel Management (OPM) and the Bureau of Labor Statistics (BLS). OPM supplied data on government salaries. BLS furnished data on industry salaries and thirteen different materials. The computer program prints the R&D historical inflation indices and subindices by fiscal year as shown in Appendices C through G of this report. GRA

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

N82-28291# INCOSYM, Inc., Westlake Village, Calif.
LOW COST DEVELOPMENT OF INS SENSORS FOR EXPENDABLE RPV CONTROL AND NAVIGATION Final Report, Apr. 1979 - May 1981
D. G. Kim and James G. Russell Wright-Patterson AFB, Ohio AFWAL Aug. 1981 71 p
(Contract F33615-79-C-3616)
(AD-A112691; AFWAL-TR-81-3086) Avail: NTIS HC A04/MF A01 CSCL 01/3

A two year development effort has resulted in the design, fabrication and test of a feasibility model 3-axis vibrating beam accelerometer and a brassboard cycloidal magnetic vector sensor. The cycloidal magnetic vector sensor is based on a rotating coil technique which eliminates slip rings. It performed as expected, and demonstrated an accuracy of approximately 0.25 degrees. The 3-axis vibrating beam accelerometer is based on the principle that a vibrating beam will change its frequency as a function of the applied tension. Using six beams, two per sensing axis, connected to a common mass, a 3-axis accelerometer can be designed. Such a design measures acceleration, by a change in beam vibration frequency, as a function of applied acceleration to the mass. The accelerometer, at first, demonstrated an insensitivity due to frequency lock between the beams. This effect was eliminated, but the necessary change in design caused an unstable bias and non-linearity of the scale factor. A solution to these problems was also conceived, and hardware changes made. However, to fully demonstrate the concept requires a computer and software, which is outside the scope of this program. Author (GRA)

N82-28292# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.
DESIGN STUDY FOR A LOW-DISTORTION HOLOGRAPHIC HUD Final Technical Report, Jul. 1980 - Aug. 1981
W. S. Colburn and R. C. Fairchild Wright-Patterson AFB, Ohio AFWAL Jan. 1982 104 p refs
(Contract F33615-80-C-1077)
(AD-A113982; AFWAL-TR-81-1263; ERIM-150800-29-F) Avail: NTIS HC A06/MF A01 CSCL 14/5

A low distortion holographic HUD optical system was examined. Distortion correction was based on the use of a holographic combiner made with analytically defined construction wavefronts, wavefronts for which the phase at the hologram is described by mathematical expressions. Such wavefronts are designed subsequent to the hologram design, and offer great design flexibility as their realization is based in part on the use of computer generated holograms. A method for designing the construction wavefronts of a holographic optical element based on minimizing the mean squared wavefront error while satisfying the Bragg condition is described. A holographic HUD optical system was designed for the F-16 cockpit in which distortion was corrected optically through simultaneous optimization of combiner and relay lens parameters. Both construction wavefronts of the combiner were described in terms of Legendre polynomial series. The implementation of construction beams required to form the combiner construction wavefronts is discussed. Author (GRA)

N82-28293# Federal Aviation Administration, Atlantic City, N.J.
A COMPENDIUM OF LIGHTNING EFFECTS ON FUTURE AIRCRAFT ELECTRONIC SYSTEMS Final Report
Nickolus O. Rasch Feb. 1982 257 p refs Proc. of Conf. held at Hampton, Va., 4-6 Nov. 1981
(AD-A114117; DOT-FAA-CT-82-30) Avail: NTIS HC A12/MF A01 CSCL 01/3

This publication is a composite of presentations given at the NASA-Langley Research Center/FAA Technical Center 'Lightning Effects on Future Aircraft Systems Workshop' held on November 4-6, 1981, at the NASA-Langley Research Center Facility. The presentations encompassed the full spectrum of

lightning research from lightning phenomonology, lightning modeling, electromagnetic issues associated with composite materials, to the lightning/aircraft electromagnetic interaction analysis. Also included are a total of five presentations assessing the Digital System upset phenomena. Author (GRA)

N82-28294# Grumman Aerospace Corp., Bethpage, N.Y.
HYDRAULIC UNIVERSAL DISPLAY PROCESSOR SYSTEM (HUDPS) Final Report, 1 Apr. - 1 Sep. 1981
John J. Duzich and Herman L. Dreksler Warminster, Pa. Naval Air Development Center 21 Nov. 1981 66 p refs
(Contract N62269-81-C-0243)
(AD-A114428; NADC-82053-60) Avail: NTIS HC A04/MF A01 CSCL 01/3

This six month study effort explored methods of display fault indication to ground support personnel and optimize microprocession circuitry for universal aircraft application. Task I was established the maximum number of sensors required for a complex, comprehensive diagnostic system for the F14A as 150: Inputs could be either analog or digital. For comparison purposes, an A6E system was considered. Fault display methods were investigated with emphasis on smart alphanumeric devices in Task II. Volatile and non-volatile memory components were utilized along with the Intel 8748 microprocessor and associated EPROMS. The use of National Semiconductor ADC0816 data acquisition chips consisting of a 16 input multiplexer, an 8 bit A/D converter and an 8 bit tri-state buffered output facilitates the many inputs. Power consumption for a complete system was estimated as 5 watts while airborne. On the ground, 15 watts at 5 volts is required for display requirements. Display envelope would measure 8x7x6 and would contain approximately 6 circuit boards. In Task III a universal display processor system was formulated. A Block Diagram and several flow diagrams were generated. Multiplexer schematics were established for analog and discrete inputs. An electrical component parts list was generated for a typical system. Author (GRA)

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N82-28295*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
STATIC NOISE TESTS ON MODIFIED AUGMENTOR WING JET STOL RESEARCH AIRCRAFT
G. R. Cook and B. F. Lilley (deHavilland Aircraft of Canada, Ltd., Downsview, Ontario) Feb. 1981 58 p refs
(NASA-TM-81231; NAS 1.15:81231) Avail: NTIS HC A04/MF A01 CSCL 21E

Noise measurements were made to determine if recent modifications made to the bifurcated jetpipe to increase engine thrust had at the same time reduced the noise level. The noise field was measured by a 6-microphone array positioned on a 30.5m (100 ft) sideline between 90 and 150 degrees from the left engine inlet. Noise levels were recorded at three flap angles over a range of engine thrust settings from flight idle to emergency power and plotted in one-third octave band spectra. Little attenuation was observed at maximum power, but significant attenuation was achieved at approach and cruise power levels. T.M.

N82-28296*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
B747/JT9D FLIGHT LOADS AND THEIR EFFECT ON ENGINE RUNNING CLEARANCES AND PERFORMANCE DETERIORATION; BCAC NAIL/P AND WA JT9D ENGINE DIAGNOSTICS PROGRAMS
W. J. Olsson and R. L. Martin 19 Feb. 1982 74 p refs
Prepared in cooperation with Boeing Commercial Airplane Co., Seattle
(Contracts NAS3-20632; NAS1-15325)
(NASA-CR-165573; NAS 1.26:165573; PWA-5512-88) Avail: NTIS HC A04/MF A01 CSCL 21E

Flight loads on the 747 propulsion system and resulting JT9D blade to outer airseal running clearances during representative acceptance flight and revenue flight sequences were measured. The resulting rub induced clearance changes, and engine performance changes were then analyzed to validate and refine the JT9D-7A short term performance deterioration model. Author

N82-28297*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
CF6 JET ENGINE PERFORMANCE IMPROVEMENT: HIGH PRESSURE TURBINE ACTIVE CLEARANCE CONTROL
S. E. Rich and W. A. Fasching Jun. 1982 136 p refs
(Contract NAS3-20629)
(NASA-CR-165556; NAS 1.26:165556; R82AEB198) Avail: NTIS HC A07/MF A01 CSCL 21E

An active clearance control system was developed which reduces fuel consumption and performance degradation. This system utilizes compressor discharge air during takeoff and fan discharge air during cruise to impinge on the shroud structure to improve the thermal response. The system was evaluated in component and engine tests. The test results demonstrated a performance improvement of 0.7 percent in cruise SFC. S.L.

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N82-28298*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
ANALYTICAL AND SIMULATOR STUDY OF ADVANCED TRANSPORT Final Report
William H. Levison and William W. Rickard (Douglas Aircraft Co., Long Beach, Calif.) Washington NASA Jun. 1982 86 p refs
(Contract NAS1-16410)
(NASA-CR-3572; NAS 1.26:3572; Rept-4778) Avail: NTIS HC A05/MF A01 CSCL 01C

An analytic methodology, based on the optimal-control pilot model, was demonstrated for assessing longitudinal-axis handling qualities of transport aircraft in final approach. Calibration of the methodology is largely in terms of closed-loop performance requirements, rather than specific vehicle response characteristics, and is based on a combination of published criteria, pilot preferences, physical limitations, and engineering judgment. Six longitudinal-axis approach configurations were studied covering a range of handling qualities problems, including the presence of flexible aircraft modes. The analytical procedure was used to obtain predictions of Cooper-Harper ratings, a solar quadratic performance index, and rms excursions of important system variables. T.M.

N82-28299*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
METHODOLOGY FOR DETERMINING ELEVON DEFLECTIONS TO TRIM AND MANEUVER THE DAST VEHICLE WITH NEGATIVE STATIC MARGIN
Boyd Perry, III May 1982 50 p refs
(NASA-TM-84499; NAS 1.15:84499) Avail: NTIS HC A03/MF A01 CSCL 01C

The relationships between elevon deflection and static margin using elements from static and dynamic stability and control and from classical control theory are emphasized. Expressions are derived and presented for calculating elevon deflections required to trim the vehicle in lg straight-and-level flight and to perform specified longitudinal and lateral maneuvers. Applications of this methodology are made at several flight conditions for the ARW-2 wing. On the basis of these applications, it appears

possible to trim and maneuver the vehicle with the existing elevons at -15% static margin. Author

N82-28300*# Systems Technology, Inc., Hawthorne, Calif.
SPACE SHUTTLE FLYING QUALITIES AND FLIGHT CONTROL SYSTEM ASSESSMENT STUDY Final Report
Thomas T. Myers, Donald E. Johnston, and Duane McRuer Jun. 1982 158 p refs
(Contract NAS4-2834)
(NASA-CR-170391; NAS 1.26:170391; Rept-1174-1) Avail: NTIS HC A08/MF A01 CSCL 01C

The suitability of existing and proposed flying quality and flight control system criteria for application to the space shuttle orbiter during atmospheric flight phases was assessed. An orbiter experiment for flying qualities and flight control system design criteria is discussed. Orbiter longitudinal and lateral-directional flying characteristics, flight control system lag and time delay considerations, and flight control manipulator characteristics are included. Data obtained from conventional aircraft may be inappropriate for application to the shuttle orbiter. Author

N82-28301# Virginia Univ., Charlottesville. Dept. of Mechanical and Aerospace Engineering.
LIMITING PERFORMANCE OF NONLINEAR SYSTEMS WITH APPLICATIONS TO HELICOPTER VIBRATION CONTROL PROBLEMS Final Report
Walter D. Pilkey 1982 26 p refs
(Grant DAAG29-79-G-0015)
(AD-A113239; UVA/525098-MAE-82/10; ARO-16091.5-E) Avail: NTIS HC A03/MF A01 CSCL 20/11

This report summarizes the accomplishments of a study exploring new methods for the vibration control of helicopters. Reanalysis methodology permits a variety of vibration control problems to be solved efficiently. Both analytical and experimental studies have been conducted. Author (GRA)

N82-28302# Air Force Human Resources Lab., Brooks AFB, Tex.
MANUAL REVERSION FLIGHT CONTROL SYSTEM FOR A-10 AIRCRAFT: PILOT PERFORMANCE AND SIMULATOR CUE EFFECTS Final Report
Thomas H. Gray Mar. 1982 31 p refs
(AF Proj. 1123)
(AD-A113463; AFHRL-TR-81-53) Avail: NTIS HC A03/MF A01 CSCL 14/2

The A-10 aircraft incorporates an emergency backup control mode, the Manual Reversion Flight Control System (MRFCS). Maintaining effective control in this mode is a demanding pilot task, but it is not practiced in the flying training syllabus. Because current plans call for training this skill using simulation, information was needed on simulator cue requirements. Accordingly, the research objective was to determine the effectiveness of selected simulator visual and force cues used by experienced A-10 pilots to maintain aircraft control and to land when in the MRFCS mode. The study found that (1) a large field of view enhanced the pilot's control of the aircraft; (2) platform motion had no influence upon aircraft control; (3) aircraft control was more difficult in the MRFCS mode than in the simple single engine failure state; (4) point of failure was a significant variable reliably affecting pilot control of the aircraft; and (5) pilot performance improved as a function of practice (trials). Author (GRA)

N82-28303# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
THE DETERMINATION OF GUST LOADS ON NONLINEAR AIRCRAFT USING A POWER SPECTRAL DENSITY APPROACH
R. Noback and C. Laauboder 17 Dec. 1980 80 p refs
(Contract NIVR-RB-1854)
(NLR-TR-80123-U) Avail: NTIS HC A05/MF A01

Since the power spectral density method cannot determine the exceedance of the output over the input in the nonlinear equations which describe an aircraft subjected to atmospheric turbulence, methods which approximate the exceedance curve were developed. One method is analogous to the classical expression for the equivalent gain. Another is analogous to the equivalent gain based on minimum error in energy. In both, the maximum value (mu zy) of the cross correlation function between output and input to the nonlinearity is used. A reasonable estimate of the exceedance curve, for systems for which mu zy is not known, can be obtained if the correlation between the input to the nonlinearity (z) and the system output (y) is high. The ratio of the standard deviations of z and y can then be used. Design loads based on mission analysis can be established once the load exceedance curve due to constant standard deviation of the input is known. A definition for the design load of nonlinear aircraft using the design envelope method is proposed. Author (ESA)

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space)*.

N82-28304*# Southampton Univ. (England).
STREAMLINING THE WALLS OF AN EMPTY TWO-DIMENSIONAL FLEXIBLE-WALLED TEST SECTION Progress Report
S. W. D. Wolf, M. J. Goodyer, and I. D. Cook May 1982 10 p refs
(Grant NsG-7172)
(NASA-CR-165936; NAS 1.26:165936) Avail: NTIS HC A02/MF A01 CSCL 14B

The techniques used to find aerodynamically straight wall contours in a test section of a transonic wind tunnel are discussed. The walls were defined as aerodynamically straight up to Mach 0.9. R.J.F.

N82-28305# Seville Research Corp., Pensacola, Fla.
OPERATIONAL TEST AND EVALUATION HANDBOOK FOR AIRCREW TRAINING DEVICES. VOLUME 2: OPERATIONAL EFFECTIVENESS EVALUATION Final Report
William V. Hagin, Stephen R. Osborne, Roik L. Hockenberger, James P. Smith, and Thomas H. Gray (AFHRL, Williams AFB, Ariz.) Brooks AFB, Texas AFHRL Feb. 1982 290 p refs
(Contract F33615-78-C-0063; AF Proj. 1123)
(AD-A112570; AFHRL-TR-81-44-Vol-2) Avail: NTIS HC A13/MF A01 CSCL 05/9

The Handbook is comprised of three volumes and is intended to provide guidelines and procedures appropriate for Air Force Operational Test and Evaluation (OT&E) personnel to use in planning, conducting and reporting the results of simulator assessment efforts. Although of value to all test personnel, it is primarily for the typical novice test manager/director - a person who has subject matter expertise (e.g., a qualified pilot or operator), but who may have little or no previous OT&E experience. The Handbook provides detailed coverage on OT&E planning and management with special emphasis on measuring device operational effectiveness and suitability. In accord with its objectives, the Handbook was prepared to serve as a supplement to Air Force Manual 55-43, 'Management of Operational Test and Evaluation' by providing those specific additional evaluation concepts and techniques necessary for aircrew training device test and evaluation. Author (GRA)

N82-28306# Seville Research Corp., Pensacola, Fla.
OPERATIONAL TEST AND EVALUATION HANDBOOK FOR AIRCREW TRAINING DEVICES. VOLUME 3: OPERATIONAL SUITABILITY EVALUATION Final Report
William V. Hagin, Stephen R. Osborne, Roik L. Hockenberger, James P. Smith, and Thomas H. Gray (Operations Training Div., Williams AFB, Ariz.) AFHRL - Brooks AFB, Tex. Feb. 1982 128 p refs
(Contract F33615-78-C-0063; AF Proj. 1123)
(AD-A112569; AFHRL-TR-81-44-Vol-3) Avail: NTIS HC A07/MF A01 CSCL 05/9

The Handbook is comprised of three volumes and is intended to provide guidelines and procedures appropriate for Air Force

Operational Test and Evaluation (OT&E) personnel to use in planning, conducting and reporting the results of simulator assessment efforts. Although of value to all test personnel, it is primarily for the typical novice test manager/director - a person who has subject matter expertise (e.g., a qualified pilot or operator), but who may have little or no previous OT&E experience. The Handbook provides detailed coverage on OT&E planning and management with special emphasis on measuring device operational effectiveness and suitability. In accord with its objectives, the Handbook was prepared to serve as a supplement to Air Force Manual 55-43, 'Management of Operational Test and Evaluation,' but providing those specific additional evaluation concepts and techniques necessary for aircrew training device test and evaluation. GRA

N82-28307# Strategic Air Command, Offutt AFB, Nebr. Aircraft Engineering Div.
ALERT AIRCRAFT ROLL OVER CHOCKS Final Engineering Report
John M. Connolly 14 Aug. 1981 53 p
(AD-A107456; SAC/LGME-ER-P-372) Avail: NTIS HC A04/MF A01 CSCL 01/5

The feasibility of restraining a parked alert aircraft with chocks which could be safely taxied over was studied. Chocks were designed and then evaluated during SAC Giant Match II exercise. The chocks successfully restrained a parked aircraft and allowed a heavy weight aircraft to safely taxi over when the chocks were placed on a rough surface. Roll-over chock use was expanded command wide for B-52G and KC-135 alert aircraft except on icy surfaces. Three ice gripping surface designs were evaluated. All three designs performed successfully. Author

N82-28308# Army Armament Research and Development Command, Dover, N. J. Technical Support Directorate.
SIX-DEGREE-OF-FREEDOM (6-DOF) SIMULATOR FOR WEAPON TESTING Final Report
Donald E. Frericks and Robert J. Radkiewicz Mar. 1982 39 p
(AD-A113536; AD-E400798; ARTSD-TR-81002) Avail: NTIS HC A03/MF A01 CSCL 14/2

A six-degree-of freedom (6-DOF) simulator has been constructed and implemented as a test bed for military vehicles and individual weapon systems. These weapon systems are either attached directed to the simulator or connected to vehicle sections suspended from it. Simulation includes firing and response to firing loads using appropriate conversion and movement which parallels weapon firing in the field. While firing, the weapon systems can be moved in either simple harmonic motion driven by a signal generator or complex motion obtained from a field tape operated by a digital computer. Vibrations typical of the field environment are input through the actuator. GRA

N82-28309# Naval Training Equipment Center, Orlando, Fla. Advanced Simulation Concepts Lab.
COMPUTER PROGRAM FOR ANALYSIS OF SPHERICAL SCREEN DISTORTION Technical Report, Oct. 1980 - Feb. 1981
Richard C. Hebb Mar. 1982 71 p refs
(AD-A113136; NAVTRAEQUIPC-IH-332) Avail: NTIS HC A04/MF A01 CSCL 05/9

In visual simulation, the distortion of imagery in wide-angle display systems is a major concern. Effective flight training requires that the imagery presented to a trainee provide a proper perspective view of his simulated environment without distortion. Use of spherical screens (domes) introduces perspective and geometrical distortion into these wide-angle displays. Use of video projection systems with Computer Image Generation (CIG) offers the options of raster shaping or computer remapping for distortion correction. The method is to correct the imagery before projection in order to provide a non-distorted scene to a trainee. This report is documentation of a computer program for analysis of the required raster correction for specific projector/viewpoint positioning within a spherical screen. The programs and report were initiated to provide input to the F-18 simulator (Device 2E7) being developed by Hughes Aircraft. Author (GRA)

N82-28310# Aeronautical Research Labs., Melbourne (Australia).
PROGRAMS FOR THE TRANSONIC WIND TUNNEL DATA PROCESSING INSTALLATION. PART 8: PROGRAMS FOR PROCESSING DATA ON THE CENTRAL SITE COMPUTER
B. D. Fairlie Sep. 1980 32 p refs
(AD-A112900; ARL/AERO-TM-324-Pt-8) Avail: NTIS HC A03/MF A01 CSCL 09/2

Three programs which run on the central site computer (PDP-10) are described. The first, PLT8 complements and extends the tunnel installation six-component force data plotting system. The second, INTEG integrates aerofoil surface pressure measurements. The third, PLTALL plots these surface pressure data. Author (GRA)

N82-28311# Aeronautical Research Labs., Melbourne (Australia).
DESIGN BASIS FOR A NEW TRANSONIC WIND TUNNEL
J. B. Willis and N. Pollock Jan. 1982 27 p refs
(AD-A112899; ARL/Aero-TM-335; AR-002-326) Avail: NTIS HC A03/MF A01 CSCL 14/2

The existing ARL Transonic Wind Tunnel, which is the largest such tunnel in Australia, has severely limited testing capabilities due to a low test Reynolds number and an inadequate test section size. These deficiencies are becoming more acute as military aircraft performance capabilities increase. For current fighter aircraft, the ratio of tunnel test to flight Reynolds number is about 1:100 and the extrapolation of tunnel data to flight carries a high risk of serious error and for some conditions is not possible at all. The small test section size limits the scale of the models which can be tested. The difficulty of machining small models to the required accuracy produces excessive manufacturing times. Moreover, it is not possible to incorporate remotely adjusted control surfaces. These two factors severely restrict tunnel productivity. Given adequate support, it should be possible to build and commission a suitable new wind tunnel in about five years, at a cost substantially less than that of a single military fighter aircraft. GRA

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

N82-28312*# California Univ., San Diego. Center for Astrophysics and Space Science.
PIONEER 10/11 DATA ANALYSIS OF THE TRAPPED RADIATION EXPERIMENT Final Report
Walker Fillius Jan. 1982 214 p refs
(Contract NAS2-6552)
(NASA-CR-166360; NAS 1.26:166360) Avail: NTIS HC A10/MF A01 CSCL 22A

The data handling operations and the database produced by the Trapped Radiation Experiment on the NASA Pioneer 10 and 11 spacecraft are outlined. In situ measurements of trapped radiation at both Jupiter and Saturn, the extension of cosmic ray observations to the outer heliosphere, the presence of Jovian electrons in interplanetary space, analyses of the interaction between planetary satellites and the trapped radiation that engulfs them, and further investigations of the radiation enviroments of both planets are reported. Author

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N82-28313*# Analytical Mechanics Associates, Inc., Hampton, Va.
RECONSTRUCTION OF THE 1ST SPACE SHUTTLE (STS-1) ENTRY TRAJECTORY Final Report
J. T. Findlay, G. M. Kelly, and M. L. Heck Washington NASA Jun. 1982 165 p refs
(Contract NAS1-16087)
(NASA-CR-3561; NAS 1.26:3561; AMA-82-6) Avail: NTIS HC A08/MF A01 CSCL 22A

A discussion of the generation of the best estimate trajectory (BET) of the first Space Shuttle Orbiter entry flight is presented.

The BET defines a time history of the state, attitude, and atmospheric relative parameters throughout the Shuttle entry from an altitude of approximately 183 km to rollout. The inertial parameters were estimated utilizing a weighted least squares batch filter algorithm. Spacecraft angular rate and acceleration data derived from the Inertial Measurement Unit were utilized to predict the state and attitude which was constrained in a weighted least squares process to fit external tracking data consisting of ground based S-band and C-band data. Refined spacecraft altitude and velocity during and post rollout were obtained by processing artificial altimeter and Doppler data. The BET generation process is discussed. Software and data interface discussions are included. The variables and coordinate systems utilized are defined. STS-1 mission peculiar inputs are summarized. A listing of the contents of the actual BET is provided. Author

N82-28314# State Univ. of New York, Binghamton. Dept. of Computer Science.
OPTIMAL ALPHA-BETA FILTERING FOR TRACKING REENTRY VEHICLES FROM SHIPBOARD RADARS Final Report, 15 Feb. 1981 - 15 Feb. 1982
V. Vemuri 15 Feb. 1982 31 p refs
(Grant AF-AFOSR-0076-81; AF Proj. 2304)
(AD-A113076; AFOSR-82-0245TR) Avail: NTIS HC A03/MF A01 CSCL 17/9

An optimal filter, equivalent to Kalman filtering, is developed for tracking reentry vehicles from shipboard radars. This filter is simpler to implement than Kalman and is based on the idea of minimizing the mean squared error in the position of the reentry vehicle. Author (GRA)

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air)*.

N82-28315# Range Commanders Council, White Sands Missile Range, N. Mex. Range Safety Group.
UNGUIDED ROCKET SAFETY: AN INFORMAL COMPENDIUM OF RANGE TECHNIQUES FOR ASSURING SAFETY IN ROCKET TESTING
Mar. 1982 176 p Sponsored in part by Army, Navy and AF
(AD-A113765) Avail: NTIS HC A09/MF A01 CSCL 13/12

Unguided rocket programs, analyzed to obtain a safety solution to rocket launches, are summarized. Unique techniques that may be beneficial to other ranges are described in detail. Any recommendations supporting the use of various techniques are also included. Rocket testing approaches for ranges and potential rocket programs for reference, planning, and evolving new support techniques are presented. Author

N82-28316# Bendix Corp., Kansas City, Mo.
ENVIRONMENTAL CHAMBER LOW TEMPERATURE CUTOFF Final Report
L. A. Robinson Jan. 1982 12 p
(Contract DE-AC04-76DP-00613)
(DE82-007626; BDX-613-2722) Avail: NTIS HC A02/MF A01

Many environmental chambers use liquid nitrogen as a coolant. The solenoid valves which control the flow of liquid nitrogen periodically fail to close when necessary. Products being tested can then be subjected to damaging environmental stresses. The system developed overcomes this problem and appears readily adaptable to a wide range of chambers. DOE

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N82-28317*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TERRESTRIAL ENVIRONMENT (CLIMATIC) CRITERIA GUIDELINES FOR USE IN AEROSPACE VEHICLE DEVELOPMENT
Robert E. Turner, comp. and C. Kelly Hill, comp. Jun. 1982 418 p refs Revised
(NASA-TM-82473; ES84; NAS 1.15:82473) Avail: NTIS HC A18/MF A01 CSCL 22B

Guidelines on terrestrial environment data specifically applicable for NASA aerospace vehicles and associated equipment evelopment are provided. The general distribution of natural environmental extremes in the conterminous United States that may be needed to specify design criteria in the transportation of space vehicle subsystems and components is considered. Atmospheric attenuation was included, since certain Earth orbital experiment missions are influenced by the Earth's atmosphere. Climatic extremes for worldwide operational needs is also included. Atmospheric chemistry, seismic criteria, and a mathemetical model to predict atmospheric dispersion of aerospace engine exhaust cloud rise and growth are discussed. Atmospheric cloud phenomena are considered. Author

N82-28318*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
APPARATUS FOR RELEASABLY CONNECTING FIRST AND SECOND OBJECTS IN PREDETERMINED SPACE RELATIONSHIP Patent Application
Joseph A. Chandler, inventor (to NASA) Filed 14 Apr. 1982 21 p Sponsored by NASA
(NASA-Case-MSC-19369-1; US-Patent-Appl-SN-368189) Avail: NTIS HC A02/MF A01 CSCL 22A

Apparatus for allowing remote control of undocking and redocking of a space experiment vehicle to a supporting spacecraft is described. N.W.

N82-28319# Weapons Systems Research Lab., Adelaide (Australia).
THE USE OF A DEFLECTABLE NOSE ON A MISSILE AS A CONTROL DEVICE
K. D. Thompson May 1981 69 p refs
(AD-A112179; WSRL-0211-TR) Avail: NTIS HC A04/MF A01 CSCL 20/4

Wind tunnel tests have been carried out on a blunted ogive-cylinder with a deflectable nose at Mach numbers between 0.8 and 2.0. Although the results are subject to scale effects, it appears that the deflectable nose could find use as a missile control method. The results have been applied to two missile configurations. For a long slender missile the deflectable nose produces non-linear trim curves at subsonic speeds, approaching linearity at supersonic Mach numbers. Nevertheless, worth-while trimmed incidences can be achieved. Although a deflectable nose on a 105 mm shell at subsonic speeds produces only relatively small normal force coefficients at trim, the trim curves are linear. Furthermore, it appears that when used for terminal control significant deviations in shell impact point are attainable. GRA

N82-28320# Range Commanders Council, White Sands Missile Range, N. Mex. Range Safety Group.
FLIGHT TERMINATION SYSTEM EQUIPMENT. VOLUME 1: ANTENNAS AND ANTENNA COUPLERS Final Report
1982 38 p
(AD-A113493; RSG-317-82-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 09/1

This document is the result of the efforts of the Flight Termination System Ad Hoc Committee of the Range Safety Group, Range Commanders Council. The Flight Termination System Equipment Catalog provides a ready reference to missile antennas and antenna couplers used at U.S. missile ranges and

test facilities. Since use of each antenna/antenna coupler must be approved by the Range Commander with the in-flight range safety responsibility, inclusion in this catalog does not constitute sanction of such use nor approval for use on other missiles/space vehicles on the same range or on the same missile/space vehicle on other ranges. This catalog is not intended to be a comprehensive review of all flight termination antennas/antenna couplers available on the open market. The information contained in this publication has been provided by the manufacturer or extracted from manufacturers specifications and is provided only as a guide. No conclusions are to be implied or assumed relative to the merits of one antenna/antenna coupler versus another. Where applicable, a history of the flight usage has been provided.
Author (GRA)

N82-28321# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CHINA'S BALLISTIC MISSILE PROGRAM
Mark Weder 6 Apr. 1982 12 p Transl. into ENGLISH from Hangkong Zhishi (Communist China), no. 4 Apr. 1981 p 24-26
(AD-A114260; FTD-ID(RS)T-1449-81) Avail: NTIS HC A02/MF A01 CSCL 16/4

Progress in China's development of ballistic missiles and satellite launching rockets is discussed. Historical background material is provided and several missiles are described. The missile program plans are discussed and an evaluation of China's nuclear capabilities is given. R.J.F.

N82-28322# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Information und Dokumentation.
FUTURE COMMUNICATION SATELLITE SYSTEMS AND TECHNOLOGY TRENDS
H. Kellermeier and D. E. Koelle 1981 37 p Presented at TMSA/TTS Conf., Munich and London, Oct. 1981
(MBB-UB-542-81-O) Avail: Issuing Activity

Technological trends in communication satellite design and requirements were identified. The Intelsat program, TDR satellite systems, and the European large GEO platforms project were reviewed. There is a tendency towards modularized satellite buildup, large unfurlable lightweight multiple beam antennas 4 to 10 m for high frequencies (12 to 30 GHz) and up to larger than 100 m for lower frequencies, and large deployable solar arrays. Antenna pointing accuracies of 0.05 deg are required along with three axis stabilization and FR sensors with antenna pointing mechanisms. Use of a B1 propellant integrated propulsion system for injection and attitude control as well as of electric propulsion for N-S stationkeeping and attitude control for large platforms are foreseen. Increasing application of satellite-switched time division multiple access and of large scale frequency reuse by multiple spot beam antennas with large reflectors for point-to-point communication (data transfer and teleconferencing) are noted. More large communication platforms in geosynchronous orbit in order to avoid the 24 hour orbit saturation problem and large size (> or = 7 m dia) unmanned, reusable launch systems for cargo transfer are also predicted. Author (ESA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

N82-28323*# National Aeronautics and Space Administration, Washington, D. C.
THIRD TEST FLIGHT OF SHUTTLE (STS-3)
1982 4 p refs
(NASA-EB-82-4) Avail: SOD CSCL 22A

Various aspects of the Space Transportation System 3 flight are discussed. Thermal tests to check the orbiter response to extreme temperature conditions are described. Experiments relating to weightlessness, solar X-rays, materials processing, and bioengineering are discussed. Environmental tests of the area around the launch pad are described. R.J.F.

N82-28324# Aerospace Corp., El Segundo, Calif. Operations Lab.
SD/LDEF TECHNICAL USER'S MANUAL
Robert P. Giguere 30 Sep. 1981 117 p refs
(Contract F04701-80-C-0081)
(AD-A113504; TR-0081(6950-05)-2; SD-TR-81-86) Avail: NTIS HC A06/MF A01 CSCL 09/3

This report provides a complete review of the flight and ground support electronics with an emphasis on documenting the electronics programming particular to this mission. The electronics fabricated by MSL and the test plan for the hardware flight qualification tests from component to system levels are documented. Appendix A gives a breakdown of the transducers used and their locations so that these data can be easily shared among the many experimenters. Author (GRA)

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

N82-28325*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LAND MOBILE SATELLITE SERVICE (LMSS): A CONCEPTUAL SYSTEM DESIGN AND IDENTIFICATION OF THE CRITICAL TECHNOLOGIES. PART 1: EXECUTIVE SUMMARY
Firouz Naderi, ed. 15 Feb. 1982 74 p 2 Vol.
(NASA-CR-169135; JPL-PUB-82-19-Pt-1; NAS 1.26:169135) Avail: NTIS HC A04/MF A01 CSCL 17B

A system design for a satellite aided land mobile service is described. The advanced system is based on a geostationary satellite which employs a large UHF reflector to communicate with small user antennas on mobile vehicles. It is shown that the system through multiple beam antennas and frequency reuse provides for radiotelephone and dispatch channels. It is concluded that the system is technologically feasible to provide service to rural and remote regions. For individual titles, see N82-28326 through N82-28329.

N82-28326*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LAND MOBILE SATELLITE SERVICE
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 p 6-16 (For primary document see N82-28325 19-17)
Avail: NTIS HC A04/MF A01 CSCL 17B

The land mobile satellite service (LMSS) a spacecraft in geostationary orbit which relays radio messages to many land mobile units is reported. The LMSS's feature is its large antenna which enables communication with small mobile equipment. With the large antenna the spacecraft forms multiple coniguous spot beams which provide blanket coverage. The reuse of the available frequency band among the beams gives efficient utilization of the spectrum. E.A.K.

N82-28327*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LMSS TELECOMMUNICATION NETWORK DESIGN
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 p 20-27 (For primary document see N82-28325 19-17)
Avail: NTIS HC A04/MF A01 CSCL 17B

The conceptional land mobile satellite service (LMSS) design is discussed. The following requirements are outlined: network design parameters, multiple beam layout, and a LMSS network design summary. The market requirements are as follows: the area to be served, time frame, capacity, type of service, cost considerations, compatibility and quality. E.A.K.

N82-28328*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MSAT DESIGN
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 p 30-67 (For primary document see N82-28325 19-17)
Avail: NTIS HC A04/MF A01 CSCL 17B

The design of the communication satellite MSAT which is the central component of a land mobile satellite service (LMSS) system is reviewed. The following topics are discussed: UHF antenna geometry, overlapping cluster feed conept, UHF feed array, cluster feed RF pattern, frequency reuse plan, beam isolation performance, beam forming network, LMSS link budget, UHF feed thermal hardware, UHF antenna structure, MSAT deployed configuration, MSAT attitude control and MSAT stowage. E.A.K.

N82-28329*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MOBILE VEHICLE ANTENNA
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 p 70-71 (For primary document see N82-28325 19-17)
Avail: NTIS HC A04/MF A01 CSCL 17B

The antenna concept of the land mobile satellite service (LMSS) is examined. Based on the LMSS design the ground mobile vehicle antennas must meet the following requirements: (1) low cost; (2) reasonable conformal or easily stowable in the vehicle; (3) circular polarization; (4) transmitting at 821 to 831 MHz, and receiving at 866 to 876 MHz band; (5) omnidirectional pattern in azimuthal plane; and (6) a minimum of 3-dB gain in the angular region from 19 to 60 deg from the horizon in elevation plane. Three classes of antenna design, the crossed drooping dipole, the quadrifilar, and a microstrip array antenna are shown. E.A.K.

N82-28330*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LAND MOBILE SATELLITE SERVICE (LMSS): A CONCEPTUAL SYSTEM DESIGN AND IDENTIFICATION OF THE CRITICAL TECHNOLOGIES: PART 2: TECHNICAL REPORT
Firouz Naderi, ed. 15 Feb. 1982 405 p refs 2 Vol.
(Contract NAS7-100)
(NASA-CR-169136; JPL-PUB-82-19-Pt-2; NAS 1.26:169136)
Avail: NTIS HC A18/MF A01 CSCL 17B

A conceptual system design for a satellite-aided land mobile service is described. A geostationary satellite which employs a large (55-m) UHF reflector to communicate with small inexpensive user antennas on mobile vehicles is discussed. It is shown that such a satellite system through multiple beam antennas and frequency reuse can provide thousands of radiotelephone and dispatch channels serving hundreds of thousands of users throughout the U.S. For individual titles, see N82-28331 through N82-28341.

N82-28331*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INTRODUCTION
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 19 p refs (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

The concept of land mobile service is reviewed. The conventional terrestrial mobile radio systems, including dispatch and radiotelephone are described. The more advanced cellular system is described, and the way it mitigate the many problems currently plaguing the conventional terrestrial mobile service are discussed. The concept of the Land Mobile Satellite Service is introduced. How a satellite system can augment the terrestrial system for a truly ubiquitous coverage is shown. The operation of a multiple beam satellite system is explained in terms of its similarities with the terrestrial cellular systems. The potential frequency spectrum availability for the LMSS in the United States is included. Author

N82-28332*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LMSS COMMUNICATION NETWORK DESIGN
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 43 p refs (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

The architecture of the telecommunication network as the first step in the design of the LMSS system is described. A set of functional requirements including the total number of users to be served by the LMSS are hypothesized. The design parameters are then defined at length and are systematically selected such that the resultant system is capable of serving the hypothesized number of users. The design of the backhaul link is presented. The number of multiple backhaul beams required for communication to the base stations is determined. A conceptual procedure for call-routing and locating a mobile subscriber within the LMSS network is presented. The various steps in placing a call are explained, and the relationship between the two sets of UHF and S-band multiple beams is developed. A summary of the design parameters is presented. Author

N82-28333*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SATELLITE SYSTEM DESIGN
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 186 p refs (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

The design of the MSAT spacecraft for the LMSS is presented. The most important requirement affecting the design of MSAT is that of producing a prescribed number of multiple beams. A conceptual design for MSAT describing most major subsystem individually is developed. The design of the large UHF multiple beam antenna and its associated feed array which are the most singularly prominent features of MSAT is emphasized. The overall design is outlined, and each subsystem is discussed. The design of the feed array and the RF, control, power, propulsion, and thermal subsystem are included. The RF performace of the UHF antenna, including its beam isolation performance, is discussed. The volume and mass properties of MSAT and its Shuttle launch considerations are also included. Author

N82-28334*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE GROUND SEGMENT
In its Land Mobile Satellite Serv. (LMSS): A Conceptural System Design and Identification of the Critical Technol. 15 Feb. 1982 22 p refs (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

The LMSS ground segment consists of two types of terminals, mobile and fixed. The salient features of these two components of the LMSS ground segment are discussed. Factors surrounding selection of a modulation scheme for the LMSS are presented. The mobile vehicle antenna, which with its attendant mechanical and electrical requirements pose a challenging problem to the LMSS designers, is covered. Author

N82-28335*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE TECHNOLOGY
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 52 p refs (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

The technology development needed to support the satellite system conceptual design is amplified. Activities connected to RF, control, and structure of the MSAT UHF antenna are addressed. The antenna RF activities are considered, and two studies related to the reflector surface tolerance and the microstrip feed technology are described. The software and hardware needed to implement the attitude control conceptual design are reviewed. Antenna structure development for the reflector and the deployable supporting mast is discussed. UHF feed located electronics are addressed. Author

N82-28336*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CASSEGRAIN DUAL REFLECTOR ANTENNA DESIGN
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982

8 p ref (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

A folded optics reflector system could mitigate problems associated with the pointability and controllability of the large UHF antenna for MSAT. Such a system is comprised of a parabolic main reflector and a hyperboloidal subreflector (Cassegrain arrangement) or an ellipsoidal subreflector (Gregorian arrangement), either of which brings the feed closer to the main reflector. By shaping the subreflector and the main reflector, an improved scan capability might be achieved and the size of the required feed aperture-per-beam could be reduced. In such a shaped dual reflector system, the need for overlapping cluster feed arrangement and its concomitant beam forming network could be removed. In this system, a relatively low gain feed element together with the shaped subreflector would be sufficient to produce the required high illumination taper that at the main reflector. A.R.H.

N82-28337*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DUAL-SHAPED REFLECTOR DESIGN
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 8 p (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

Software for dual shaped reflector synthesis was upgraded to more rapidly and automatically generate an entire 3-dimensional, 2-reflector system as opposed to arbitrarily chosen profiles. A physical optics/physical optics analysis program was developed which used raw data without interpolation and converts these data into triangular facets that are appropriately ordered and thinned. A series of profiles was developed. These profiles are not rotationally symmetric nor a portion of a parent circularly symmetric geometry. They should provide -30 dB sidelobes for the feed located at the focus. The eometry permits one beam for feed in a multiple beam configuration. The geometric theory of diffraction was used to test the geometry. A.R.H.

N82-28338*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DUAL POLARIZATION
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 16 p (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

For the LMSS, the required beam isolation level necessitates that the computed C/I level under idealized conditions be equal or higher than 27 dB. This means that the received carrier in the footprint of any reference beam should be at least 27 dB higher than the aggregate power of the interfering carriers from all other cochannel beams. In order to achieve this beam isolation, the baseline design opts for a 7-frequency reuse plan in which only one mode of polarization is used. The possibility of using a 4-frequency and 2-polarization reuse plan, (i.e., 4 x 2 = 8 diversity), was investigated. The system implications of using a dual polarization scheme, the level of cross-polarization required to insure the desired 27 dB beam isolation, and whether or not the determined level of cross-polarization is achievable with the microstrip feed arrays used in the baseline design are considered. A.R.H.

N82-28339*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INTERMODULATION ANALYSIS
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 11 p refs (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

In single channel-per-carrier (SCPC) telecommunication system, hundreds of carriers are routed through common nonlinear satellite amplifiers causing intermodulation distortion. While *development of nearly linear and efficient high-power amplifiers* is essential to LMSS to reduce this distortion, some degree of intermodulation is unavoidable. An evaluation of the *carrier-to-intermodulation ratio for each channel* is an essential element in the design of such systems for optimum utilization of satellite power and bandwidth. The determination of channel distribution *within the power amplifier* bandwidth is considered. A.R.H.

N82-28340*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MULTIPLE BEAM OFFSET ANTENNA DESIGN PROCESSES
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 15 p refs (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 17B

Both RF design steps and performance evaluation processes of multiple beam offset parabolic reflectors are described. Attempts are made to present the general methodology with a demonstration of the final results. A.R.H.

N82-28341*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ELECTRIC PROPULSION c20
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 7 p (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 21C

An alternative propulsion subsystem for MSAT is presented which has a potential of reducing the satellite weight by more than 15%. The characteristics of pulsed plasma and ion engines are described and used to estimate of the mass of the propellant and thrusters for attitude control and stationkeeping functions for MSAT. Preliminary estimates indicate that the electric propulsion systems could also replace the large momentum wheels necessary to counteract the solar pressure; however, the fine pointing wheels would be retained. Estimates also show that either electric propulsion system can save approximately 18% to 20% of the initial 4,000 kg mass. The issues that require further experimentation are mentioned. A.R.H.

N82-28342# Mitre Corp., Bedford, Mass.
MULTIPATH ANALYSIS OF TELEMETRY SUPPORT POSITIONS FOR APATS
G. A. Robertshaw Apr. 1982 112 p refs
(Contract F19628-82-C-0001; AF Proj. 4290)
(AD-A114057; MTR-8277; ESD-TR-81-395) Avail: NTIS HC A06/MF A01 CSCL 09/6

It is anticipated that multipath propagation interference due to reflection from the sea will degrade APATS (ARIA Phased Array Telemetry System) reentry vehicle (RV) telemetry links. However, it is often feasible to reduce such interference by proper tailoring of the receiver position to the RV reentry parameters and telemetry characteristics. Theoretical analyses are presented which advocate specific ARIA flight constraints for several examples of P-band and S-band links in the context of nominal RV-aircraft (APATS) configurations. Issues such as APATs antenna gain, intersymbol interference, coherent and incoherent reflection from the sea, RV antenna gain, differential Doppler, RV-APATS geometry and RV trajectory are addressed in sufficient generally to permit application of basic multipath mitigation principles to a wide range of mission scenarios. GRA

N82-28343# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. *Ocean Science and Technology Lab.*
ANALOG DATA COMPRESSION FOR VERSATILE EXPERIMENTAL KEVLAR ARRAY (VEKA) TELEMETRY
Norman H. Gholson and Portia Harris Aug. 1981 38 p *refs*
(AD-A114324; NORDA-TN-131) Avail: NTIS HC A03/MF A01 CSCL 09/6

The feasibility of amplitude data compression has been explored with respect to the Versatile Experimental Kevlar Array (VEKA) analog multiplexed telemetry of acoustic data. A Fourier transform approach has been developed to quantify the potential benefits and penalties associated with a particular invertible compression function. Analysis was performed using sinusoidal signals and white noise. Results of the analysis indicate that substantial gains in dynamic range can be achieved with tolerable sacrifices in telemetry system linearity. Specific examples for a particular telemetry system illustrate an increase in dynamic range from 80dB to approximately 120dB. Author (GRA)

N82-28344# Graz Univ. (Austria). Inst. fuer Nachrichtentechnik und Wellenausbreitung.
A PCM ENCODER FOR BALLOON SONDES [EIN PCM-ENCODER FUER BALLONSONDEN]

H. Slamanig Feb. 1981 19 p refs In GERMAN
(INW-8102) Avail: NTIS HC A02/MF A01

The encoder mainly consists of two plates: PCM master and PCM data. A low scanning frequency was chosen. The PCM data transmitted from the sonde are recorded on tape at low speed and can be played back at higher speed. System flexibility is emphasized. The system is universally programmable.
Author (ESA)

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

N82-28345*# Howard Univ., Washington, D. C. Dept. of Mechanical Engineering.
CONTROLLABILITY OF INHERENTLY DAMPED LARGE FLEXIBLE SPACE STRUCTURES
A. S. S. R. Reddy and Peter M. Bainum 1982 10 p refs
Proposed for presentation at 33rd Congr. of the Intern. Astron. Federation, Paris, 26 Sep. - 2 Oct. 1982
(Grant NsG-1414)
(NASA-CR-169127; NAS 1.26:169127; IAF-82-319) Avail: NTIS HC A02/MF A01 CSCL 22B

Graph theoretic techniques are used to study controllability of linear systems which represent large flexible orbiting space systems with inherent damping. The controllability of the pair of matrices representing the system state and control influence matrices is assured when all states in the model are reachable in a digraph sense from at least one input and also when the term rank of a Boolean matrix whose non trivial components are based on the state and control influence matrices has a term rank of the order of the state vector. The damping matrix does not influence the required number of actuators but gives flexibility to the possibility locations of the actuators for which the system is controllable. S.L.

N82-28346*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRELIMINARY SIZING OF VIBRATION ABSORBER FOR SPACE MAST STRUCTURES
Michael F. Card, Harvey G. McComb, Jr., and Susan W. Peebles May 1982 31 p refs
(NASA-TM-84488; NAS 1.15:84488) Avail: NTIS HC A03/MF A01 CSCL 22B

A simple method of sizing a vibration absorber for a large, cantilevered flexible mast is presented. The method is based on Den Hartog's vibration absorber theory for two-degree-of-freedom systems. Generalized design curves are presented as well as specific numerical results for a candidate space experiment in which a long flexible antenna mast is attached to the shuttle orbiter and dynamically excited by orbiter accelerations. Results indicate that for large flexible masts, the mass of the vibration absorber required to meet stringent tip deflection tolerances becomes prohibitively large. Author

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

N82-28347# Accumetrics Corp., Cambridge, Mass.
MICRO-G TRIAXIAL PIEZOELECTRIC SATELLITE ACCELEROMETER SYSTEM DEVELOPMENT Final Report, Apr. 1979 - Sep. 1981
Donald H. Fryklund Oct. 1981 45 p
(Contract F09628-79-C-0095; AF Proj. 6690)
(AD-A113849; AC-272; AFGL-TR-82-0044) Avail: NTIS HC A03/MF A01 CSCL 14/2

A triaxial piezoelectric accelerometer was developed, fabricated, tested and calibrated for use in a NASA Get-Away-Special (GAS) to be flown on the space shuttle vehicle. It is to be used for the determination of the low-level vibration environment of the instrument pallet during orbital operation, and for the possible measurement of orbital drag deceleration.
Author (GRA)

N82-28348# Panametrics, Inc., Waltham, Mass.
DESIGN, FABRICATION, CALIBRATION, TESTING AND SATELLITE INTEGRATION OF A SPACE RADIATION DOSIMETER Final Report, Sep. 1978 - Dec. 1981
Bach Sellers, Ralph Kelliher, Frederick A. Hanser, and Paul R. Morel Dec. 1981 123 p refs
(Contract F19623-78-C-0247; AF Proj. 7601)
(AD-A113085; AFGL-TR-81-0354) Avail: NTIS HC A06/MF A01 CSCL 09/3

A space-radiation dosimeter has been designed, fabricated, calibrated, tested, and integrated into a DMSP satellite payload. The dosimeter is primarily designed to measure the dose from electrons of greater than 1 MeV to greater than 10 MeV in four channels. Each channel has a different thickness aluminum dome shield over a silicon solid state detector. The solid state detector outputs are processed to provide the dose from electrons (low energy loss), the dose from protons (high energy loss), the flux of electrons, the flux of protons, and the rate of high energy loss nuclear star events. The dosimeter was extensively calibrated with nuclear radiation sources, electron beams, and proton beams. The dosimeter also has a calibration mode in which the alpha particles from a weak source behind each detector are used to check for total detector depletion and proper operation of the electronics. Author (GRA)

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion*, *28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

N82-28349*# TRW, Inc., Redondo Beach, Calif. Power Subsystem Engineering Dept.
ANALYTICAL MODELING OF SPACECRAFT POWER SYSTEMS Final Report, Jul. 1981 - Apr. 1982
John Cassinelli Apr. 1982 170 p refs
(Contract NAS5-26651)
(NASA-CR-166820; NAS 1.26:166820; TRW-38651-000) Avail: NTIS HC A08/MF A01 CSCL 22B

Power system components are reviewed. Battery and solar array models are discussed. Shunt regulators, dc-dc converters, and cabling are also discussed. N.W.

N82-28350*# Colorado State Univ., Fort Collins. Dept. of Mechanical Engineering.
ELECTRIC AND MAGNETIC FIELDS
Harold R. Kaufman, Raymond S. Robinson, and Richard D. Etters Mar. 1982 42 p refs
(Grant NsG-3011)
(NASA-CR-165604; NAS 1.26:165604) Avail: NTIS HC A03/MF A01 CSCL 21C

A number of energy momentum anomalies are described that result from the use of Abraham-Lorentz electromagnetic theory. These anomalies have in common the motion of charged bodies or current carrying conductors relative to the observer. The anomalies can be avoided by using the nonflow approach, based on internal energy of the electromagnetic field. The anomalies can also be avoided by using the flow approach, if all contributions to flow work are included. The general objective of this research is a fundamental physical understanding of electric and magnetic fields which, in turn, might promote the develop-

ment of new concepts in electric space propulsion. The approach taken is to investigate quantum representations of these fields. T.M.

N82-28351# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE RELATIONSHIP BETWEEN BALLISTIC BEHAVIOR AND STRUCTURAL MICRODEFECTS OF T PROPELLANT. AN APPLICATION OF SEM IN THE STUDY OF DOUBLEBASE PROPELLANT
Li Xuetong 13 Apr. 1982 24 p refs Transl. into ENGLISH from Acta Armamentarii (China), no. 3, Aug. 1981 p 60-67
(AD-A114381; FTD-ID(RS)T-0056-82) Avail: NTIS HC A02/MF A01 CSCL 19/1

The microstructure of a sampling T propellant at different ballistic behavior and under different manufacturing conditions is analyzed with a scanning electron microscope. The samples are taken from a homogeneous T propellant gelatinized by repellant solvent and shaped by thrusting. It is found that in the powder grain, a lot of structural microdefects are unevenly but regularly distributed; the defects on the samples of normal and abnormal ballistic behavior are clearly different; the grains with good structure made under specific manufacturing conditions show normal ballistic behavior and structural changes caused by low temperature are observed. On the basis of analyzing the micropictures, the mechanism of inherent structural defects of abnormal ballistic behavior for T propellant is presented and critical technology which makes the ballistic behavior normal is analyzed. GRA

N82-28352# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Raumfahrttechnik.
ROCKETS AND ASTRONAUTICS. (LEXICON CONTRIBUTION) [RAKETEN UND RAUMFAHRT. (BEITRAEGE FUER LEXIKON)]
Harry O. Ruppe Oct. 1981 21 p refs In GERMAN
(TUM-LRT-TB-81/11) Avail: NTIS HC A02/MF A01

A course on rockets and astronautics was given. The subjects treated were: definition of a rocket, rocket construction methods (solid fuel rockets, liquid fuel rockets, and hybrid rockets), rocket guidance, stage rockets, classification according to application, applications, and history. Author (ESA)

N82-28341*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ELECTRIC PROPULSION
In its Land Mobile Satellite Serv. (LMSS): A Conceptual System Design and Identification of the Critical Technol. 15 Feb. 1982 7 p (For primary document see N82-28330 19-17)
Avail: NTIS HC A18/MF A01 CSCL 21C

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N82-28353* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PREPARATION OF PERFLUORINATED 1,2,4-OXADIAZOLES Patent
Reinhold H. Kratzer (Ultrasystems, Inc., Irvine, Calif.), Kazimiera J. L. Paciorek (Ultrasystems, Inc., Irvine, Calif.), Thomas I. Ito (Ultrasystems, Inc., Irvine, Calif.), and Robert W. Rosser, inventors (to NASA) Issued 16 Feb. 1982 5 p Filed 27 Jun. 1980 Supersedes N80-26407 (18 - 17, p 2239)
(NASA-Case-ARC-11267-2; US-Patent-4,316,035; US-Patent-Appl-SN-163838; US-Patent-Class-547-131; US-Patent-Class-528-401; US-Patent-Class-528-422; US-Patent-Class-564-229) Avail: US Patent and Trademark Office CSCL 07C

Fluorinated alkyl or alkylether 1,2,4 oxadiazole compounds are prepared by cyclizing the corresponding alkyl or alkylether imidoyl amidoximes in vacuo or in an inert atmosphere at a temperature within the range of 40 C to 100 C. for a period of 8 to 144 hours in the presence of an acid compound which can accept ammonia to form a salt. The imidoyl amidoximes usable in this process are either polymeric or nonpolymeric. The products, when polymeric, have excellent heat, chemical and solvent resistance.
Official Gazette of the U.S. Patent and Trademark Office

24 COMPOSITE MATERIALS

Includes laminates.

N82-28354# Materials Research Labs., Melbourne (Australia).
A SEMI-ANALYTICAL MODEL FOR LASER-INDUCED ABLATION OF FIBRE RESIN COMPOSITES
K. C. A. Crane Mar. 1982 17 p refs
(MRL-R-844; AR-002-753) Avail: NTIS HC A02/MF A01

Laser induced ablation of fiber resin composites is considered using a steady state, one dimensional model. In the analysis, it is attempted to clarify the physical and chemical aspects of ablation rather than to predict ablation rates. It is shown how suitable measurements may be used in conjunction with this model to determine loss rates for combined gaseous and combined nongaseous products of ablation, and to determine the average enthalpy of each of these two losses. The model is restricted to incident irradiances in excess of approximately 30 mw/sq m and to cases in which the ablation rate varies with irradiance in a linear fashion. Because some of the required measurements may be difficult to make accurately, this analysis should be regarded as a preliminary to more detailed work. B.W.

N82-28355# Fiber Materials, Inc., Biddeford, Maine.
LOW COST 2-D HEATSHIELD MATERIALS Final Report, 28 May 1979 - 21 Nov. 1981
Robert L. Burns, J. B. Smith, and P. Dara 5 Mar. 1982 216 p refs
(Contract DAAK40-79-C-0150)
(AD-A113928; W/A-1655) Avail: NTIS HC A10/MF A01 CSCL 13/8

Heatshield materials were manufactured using braided and prepregged rubber-modified-silica-phenolic (RMSP) tapes as opposed to bias-cut broad-goods. This program demonstrated the manufacturing technology using both flat and tubular braided materials. Material test and evaluation was made by comparing the ablation erosion and thermal/mechanical properties of RMSP heatshield materials fabricated with braided versus bias-cut materials. Author (GRA)

N82-28356# Materials Sciences Corp., Spring House, Pa.
RESEARCH STUDY TO DEFINE THE CRITICAL FAILURE MECHANISMS IN NOTCHED COMPOSITES UNDER COMPRESSION FATIGUE LOADING Final Report, Sep. 1979 - Mar. 1981
B. W. Rosen, A. P. Nagarkar, R. B. Pipes, and R. Walsh Mar. 1981 105 p refs
(Contract N00019-79-C-0633)
(AD-A113654; MSC/TFR/1201/1801) Avail: NTIS HC A06/MF A01 CSCL 11/4

Analytical and experimental studies identifying the dominant failure mechanisms for compression fatigue of notched composite laminates have been conducted. The effects of stacking sequence and matrix material on damage growth as well as failure mechanisms under compression fatigue loading are reported. Two types of resin materials and four kinds of laminate layups have been considered. Two of the stacking sequences are fiber dominated and two are quasi-isotropic. Ultrasonic C-scans and photomicrographic studies have been utilized for experimental observations. An analytical methodology developed for the study of tension fatigue of notched laminates has been modified to obtain patterns of damage growth under quasi-static load by increasing it gradually in steps. For each step increase in load, a finite element stress analysis is performed and intralaminar and/or interlaminar failures in the elements are predicted. GRA

N82-28357# Universal Energy Systems, Inc., Dayton, Ohio.
AN OPTIMAL DESIGN OF SIMPLE SYMMETRIC LAMINATES UNDER THE FIRST PLY FAILURE CRITERIA Final Report, Oct. 1980 - Dec. 1981

Won J. Park Wright-Patterson AFB, Ohio AFWAL Mar. 1982 47 p refs
(Contract F33615-79-C-5129)
(AD-A113689; AFWAL-TR-81-4175) Avail: NTIS HC A03/MF A01 CSCL 11/7

Optimal design of various types of symmetric laminates for T300/5208 graphite epoxy composites was investigated under the first ply failure criteria. The symmetric laminates considered include continuous laminate and angle ply laminate. The optimal design angles 0 were obtained and presented in graphic form as functions of the loading conditions (N1, N2, N6). The results presented here are directly useful for designers for making a choice of composites for optimal performance. Author (GRA)

N82-28358# Michigan Univ., Ann Arbor. Dept. of Mechanical Engineering and Applied Mechanics.
PROPERTIES OF ORGANIC MATRIX SHORT FIBER COMPOSITES Final Report, Oct. - Dec. 1981
George S. Springer Wright-Patterson AFB, Ohio AFWAL Feb. 1982 82 p refs Prepared in cooperation with Universal Technology Corp.
(Contracts F33615-81-C-5050; F33615-79-C-5082; AF Proj. 2307)
(AD-A113606; AFWAL-TR-82-4004) Avail: NTIS HC A05/MF A01 CSCL 11/4

In this report, a summary is given of the engineering properties of chopped fiber reinforced sheet molding compounds and of the effects of service environment on these properties. The properties surveyed include tensile strength and modulus, compression strength and modulus, shear strength and modulus, flexural strength and modulus, notch sensitivity, fatigue, creep, vibration damping, response to dynamic impact, moisture absorption characteristics and thermal expansion. The basic properties of adhesive bonded single lap joints are also included in this survey. Author (GRA)

N82-28359# Materials Sciences Corp., Spring House, Pa.
ELEVATED TEMPERATURE BEHAVIOR OF METAL-MATRIX COMPOSITES Final Report, 1 Apr. 1979 - 30 Sep. 1981
Zvi Hashin and E. A. Humphreys Nov. 1981 111 p refs
(Contract F49620-79-C-0059; AF Proj. 2307)
(AD-A113128; MSC/TFR/1214/1502; AFOSR-82-0212TR) Avail: NTIS HC A06/MF A01 CSCL 11/4

A three fold approach is utilized to develop three-dimensional temperature dependent plasticity relations for unidirectional metal-matrix composites. First, two elasto-plastic boundary value problems are formulated for a typical repeating element in a hexagonal array of fibers. This is used to numerically determine temperature dependent stress-strain relations for loadings such as transverse tension, transverse shear, and axial shear. Next, global plasticity considerations are used to construct isothermal, incremental stress-strain relations for a transversely isotropic fiber composite in terms of the known one-dimensional stress-strain relations. Finally, these results are extended to include changes in temperature resulting in a set of effective stress-strain relations incremental in stress, strain, and temperature.
Author (GRA)

N82-28360# Aerospace Corp., El Segundo, Calif. Materials Sciences Lab.
IMPROVEMENT OF TRANSVERSE STRENGTH IN GRAPHITE-ALUMINUM COMPOSITES BY HIGH-STRENGTH SURFACE FOILS Interim Report
G. L. Steckel, E. G. Kendall, and W. C. Riley 1 Feb. 1982 27 p refs
(Contract F04701-81-C-0082)
(AD-A114105; TR-0082(2935-01)-1; SD-TR-81-111) Avail: NTIS HC A03/MF A01 CSCL 11/4

Graphite-aluminum composites were fabricated having special high-strength surface foils. The foils employed were an aluminum powder metallurgy alloy (IN9051) and a SiC-Al composite. Both improved the transverse strength of graphite-aluminum panels above that achieved with 6061 aluminum foils. The transverse strength of panels having the IN9051 foil was three times that of panels with 6061 foils of equivalent thickness. The primary effect of the SiC-Al foil was an improved elastic modulus in the transverse and longitudinal directions. The IN9051 foils had no effect on the composites' longitudinal strength, but the SiC-Al foil degraded the longitudinal strength. Author (GRA)

N82-28361# Ames Lab., Iowa. Dept. of Physics.
PROXIMITY EFFECT IN Cu-NbSn COMPOSITES Ph.D. Thesis
Shelly Sit-Ling ShumEucker Oct. 1981 99 p refs
(Contract W-7405-eng-82)
(DE82-005449; IS-T-974) Avail: NTIS HC A05/MF A01

Heat capacities were measured in the presence of magnetic fields for Cu-Nb and Cu-Nb3Sn in situ composites in order to determine the size of the superconducting pair potential which is induced in the normal Cu region as a function of magnetic field. For the Cu-Nb composites the induced pair potential is found to be about 0.35 MeV in zero field, in agreement with de Gennes boundary conditions. With the application of a magnetic field, the energy gap declines quickly and above about 17 mT the Cu behaves as a gapless superconductor. A family of life-time broadened density of states which gives the measured C/sub es/(Cu) is calculated based on the relation between the entropy and density of states derived for superconductors doped with paramagnetic impurities. Similar results are found in Cu-Nb3Sn composites. DOE

N82-28362# General Electric Co., Philadelphia, Pa. Space Systems Div.
TENSILE AND FATIGUE STRENGTH PROPERTIES OF KEVLAR 29 ARAMID/EPOXY UNIDIRECTIONAL COMPOSITES Final Report
Carl Zweben 22 Jul. 1981 34 p refs
(Contract W-7405-eng-48)
(DE82-006777; UCRL-15404) Avail: NTIS HC A03/MF A01

Static and fatigue tensile strength properties of filament wound undirectional Kevlar 29/epoxy, typical of filament wound materials used in flywheel rotors, were studied. Machining techniques were developed to minimize fiber fuzzing on edges. The static modulus, normalized to 70% fiber volume fraction is 8,870,000 psi. The major Poisson's ratio is 0.37. The static composite tensile strength, normalized to 70% fiber volume fraction is 200,000 psi, corresponding to a fiber stress at failure of 286,000 psi, which is good for materials having a very high fiber volume fraction. The S-N curve for R = 0.7 was quite flat. DOE

N82-28363# Dowty Rotol Ltd., Gloucester (England).
FIFTEEN YEARS EXPERIENCE WITH COMPOSITE PROPELLER BLADES
R. McCarthy 1981 37 p refs Presented at European Chapter SAMPE Intercontinental Conf. on Adv. Technol. in Mater. Eng., Cannes, France, 12-14 Jan. 1981
Avail: NTIS HC A03/MF A01

Material properties and production techniques for carbon fiber composites used on hovercraft are described. The carbon fiber is concentrated in a load carrying spar attached by a mechanical wedge joint to a metal root fitting. The spar consists of strips of fiber reinforced strips of epoxide resin wrapped in a glass cloth and filled with polyurethane foam. The assembly is sprayed with polyurethane. Rubber strips protect the leading edge. The dry lay-up/resin injection process is used. Testing includes flexure, torsion and root fatigue tests. Weathering and bird/stone impact are simulated. Operating experience, e.g., on SRN6 hovercraft, shows that the main advantages of these blades compared with Duralumin ones are: weight saving of 55 kg at 3.4 m dia; reduced pitch control moments; not subject to fatigue cracks; very damage tolerant; and easily repairable.
Author (ESA)

N82-28364# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Information und Dokumentation.
CARBON FIBER REINFORCED COMPOSITE STRUCTURES PROTECTED WITH METAL SURFACES AGAINST LIGHTNING STRIKE DAMAGE
C. M. Heckert, H. P. Wentzel (Vereinigte Flugtechnische Werke GmbH), and G. Boes (Tech. Univ., Hanover) 1982 9 p Presented at Intern. Aerospace Conf. on Lightning and Static Elec., Culham, England, 23-25 Mar. 1982
(MBB-UD-340-82-O/E) Avail: Issuing Activity

Lightning protection for carbon fiber reinforced composite

(CFC) structures, typical of parts mainly located on the surface of aircraft, was investigated. Only direct structural, effects of a lightning strike on a component were considered. As protective materials, flame sprayed aluminum, aluminum mesh, aluminum foil, and aluminum/glass hybrid fabrics were tested. Three specimen geometries were studied: (1) solid CFC plates 2 and 3 mm thick; (2) sandwich plates with CFC facing of different thickness and with different core material (aluminum and Nomex) 10 mm through; and (3) electrically bonded test specimen composed of a solid CFC plate and metal substructure. The test rig for simulating lightning discharges is described. Results consist of damage diagrams, showing specimen type, applied electrical discharge, and damaged area on protective surface and composite structure. Author (ESA)

N82-28365# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Information und Dokumentation.
DEVELOPMENT OF MATERIALS AND MANUFACTURING TECHNOLOGY OVER THE NEXT 20 YEARS: COMPOSITE MATERIALS [ENTWICKLUNG DER WERKSTOFF- UND FERTIGUNGSTECHNIK IN DEN NAECHSTEN 20 JAHREN - VERBUNDWERKSTOFFE]
C. M. Heckert 1982 17 p In GERMAN Presented at Wehrtech. Symp. Entwicklung der Werkstoffe- u. Fertigungstech. in den naechsten 20 Jahren, Mannheim, West Germany, 17 Dec. 1981; sponsored by Bundesakademie fuer Wehrverwaltung und Wehrtechnik, Mannheim, West Germany
(MBB-UD-341-82-O) Avail: Issuing Activity

The development of reinforced plastics and their application in various manufacturing processes are reviewed. The choice of CFRP or glass fiber reinforced plastic in military and commercial aircraft design is justified by higher specific strength and stiffness properties than alternative metals. Other applications are found in automobiles, railway cars, and helicopters. Size and mass reduction in parts as well as production cost savings are mentioned. Influence on manufacturing of component geometry (rod; plate; complex) is considered. The interrelationship of manufacturing capability with composite materials development is stressed through examples from industry. Author (ESA)

N82-28366# Forschungsinstitut Berghof G.m.b.H., Tuebingen (West Germany).
PRODUCTION OF IMPROVED SILICON CARBIDE FILAMENTS FOR COMPOSITE MATERIALS Final Report
Philip Gruber 1981 25 p Transl. into ENGLISH of unidentified German mono.
(PB82-138256; BMFT-FB-T-79-177) Avail: NTIS HC A02/MF A01 CSCL 11E

Three possibilities for reducing the manufacturing costs of silicon carbide filament were investigated experimentally. The results indicated that the conventional tungsten substrate can be replaced by a less expensive carbon substrate and that the production rate of the filament can be increased by employing a longer reactor. With the third possibility for cost reduction, larger diameter filaments, the tensile strengths of the filaments were not satisfactory. Employing the carbon substrate in conjunction with the higher production rate, however, an estimated savings of 50 percent could be realized in large scale production costs compared to the previous state of the art. GRA

N82-28367# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
DAMAGE DEVELOPMENT MECHANISMS IN NOTCHED GRAPHITE EPOXY COMPOSITE LAMINATES DURING COMPRESSIVE FATIGUE LOADING M.S. Thesis
Norman Frederick Black Nov. 1981 149 p refs
(Contract N62269-79-C-0261)
(PB82-142316; VPI-E-81.34) Avail: NTIS HC A07/MF A01 CSCL 11D

The damage development mechanisms in notched graphite epoxy composite laminates during constant amplitude compressive fatigue loading was investigated. Laminates of two different stacking sequences were tested. The effect of the center notch on local stress-strain behavior during static loading, and the relationship between fatigue damage and the resulting life, stiffness, and strength of the laminates were observed. GRA

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics*.

N82-28368* National Aeronautics and Space Administration. Pasadena Office, Calif.
THERMOCHEMICAL GENERATION OF HYDROGEN Patent
Daniel D. Lawson (JPL, California Inst. of Tech., Pasadena) and Gene R. Petersen, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 9 Feb. 1982 7 p Filed 30 Apr. 1980 Supersedes N80-23394 (18 - 14, p 1814) Sponsored by NASA
(NASA-Case-NPO-15015-1; US-Patent-4,314,984; US-Patent-Appl-SN-145207; US-Patent-Class-423-579; US-Patent-Class-203-12; US-Patent-Class-422-186; US-Patent-Class-422-198; US-Patent-Class-423-235; US-Patent-Class-423-539; US-Patent-Class-423-540; US-Patent-Class-423-542; US-Patent-Class-423-648R) Avail: US Patent and Trademark Office CSCL 07D

The direct fluid contact heat exchange with H_2SO_4 at about 330 C prior to high temperature decomposition at about 830 C in the oxygen release step of several thermochemical cycles for splitting water into hydrogen and oxygen provides higher heat transfer rates, savings in energy and permits use of cast vessels rather than expensive forged alloy indirect heat exchangers. Among several candidate perfluorocarbon liquids tested, only perfluoropropylene oxide polymers having a degree of polymerization from about 10 to 60 were chemically stable, had low miscibility and vapor pressure when tested with sulfuric acid at temperatures from 300 C to 400 C.

Official Gazette of the U.S. Patent and Trademark Office

N82-28369# Technische Hogeschool, Delft (Netherlands).
QUANTITATIVE THERMAL DESORPTION SPECTROMETRY OF NOBLE GASES IN SOLIDS Ph.D. Thesis
Aart Adrianus vanGorkum 12 Feb. 1981 144 p refs
Avail: NTIS HC A07/MF A01

Thermal desorption techniques to identify peaks in the spectra for different noble gases implanted in metals were studied. It was found that noble gases, except helium disorb via two mechanisms: order release for gas disorbing from binding sites close to the surface, and diffusional release from gas disorbing via a diffusion process. The binding energy of helium is different when more than one helium atom occupies a trap. The number of traps is derived by statistical analysis. A method to extract kinetic parameters from a single desorption peak is described. The mathematical theory that forms the basis of quantitative thermal desorption spectrometry (QTDS) is given. The multiple trapping of helium at xenon trap in tungsten is described. The chaneling effect of helium in W(100) is measured and effect at low energies, and entrance probability is confirmed. Helium bubble nucleation in tungsten using vacancies, annealed helium, neon, argon, krypton and xenon atoms at trapping centers is described. The importance of helium atoms clustering around impurities in metals for blistering and bubble nucleation is emphasized. For individual titles, see N82-28370 through N82-28371.

N82-28370# National Research Council of Canada, Ottawa (Ontario). Div. of Electrical Engineering.
QUANTITATIVE THERMAL DESCRIPTION SPECTROMETRY OF IONICALLY IMPLANTED INERT GASES. 1: FUNDAMENTAL ASPECTS
Aart Adrianus vanGorkum and E. V. Kornelsen *In* Techniche Hogeschool Quantitative Thermal Desorption Spectrometry of Noble Gases in Solids 12 Feb. 1981 p 5-31 refs Sponsored in part by the Dutch Ministry of Education and the Netherlands Organization for the Advancement of Pure Research (ZWO) (For primary document see N82-28369 19-25)
Avail: NTIS HC A07/MF A01

The fundamental aspects of quantitative thermal disorption

spectrometry (QTDS) of rare gases is discussed. The QTDS can be carried out if the doses are below limits to avoid: (1) the creation of surface disorder; (2) the interaction of gas atoms during the desorption cycle; (3) the retrapping of helium during the desorption cycle; and (4) the multiple occupation of traps by helium. These limits are quantified, and it is shown that in general small amounts of gas have to be detected. The accuracy with which the energy E and frequency actor v can be extracted from a measured 1st order desorption peak is limited by shot noise in the mass spectrometer. This noise is quantified for both the static and dynamic modes of operation. E.A.K.

N82-28371# National Research Council of Canada, Ottawa (Ontario). Div. of Electrical Engineering.
QUANTITATIVE THERMAL DESORPTION SPECTROMETRY OF IONICALLY IMPLANTED INERT GASES. 2: TECHNICAL REQUIREMENTS
E. V. Kornelsen and Aart Adrianus vanGorkum *In* Techniche Hogeschool Quantitative Thermal Desorption Spectrometry of Noble Gases in Solids 12 Feb. 1981 p 33-66 refs Sponsored in part by the Dutch Ministry of Education and the Netherlands Organization for the Advancement of Pure Research (ZWO) (For primary document see N82-28369 19-25)
Avail: NTIS HC A07/MF A01

The main considerations affecting the design of the sample, quantitative thermal desorption spectrometry (QTDS) its heating equipment the ion gun and the partial pressure detector to meet these requirements are discussed. Experimentally, quantitative thermal desorption spectrometry requires that a well characterized sample be subjected to specified ion bombardments, heated in an accurately defined temperature-time profile, and the resulting gas desorption rate measured with the highest available sensitivity. It is shown that the system sensitivity and background leak rate are the only apparatus parameters affecting the accuracy with which kinetic parameters (binding energy, frequency factor, reaction order) are derived from the data. Approximate limits to the achievable values of these two parameters are given. The required properties of the data acquisition system and the data treatment and analysis procedures are outlined. E.A.K.

N82-28372# Ford Aerospace and Communications Corp., Newport Beach, Calif. Aeronautic Div.
CONTINUUM ABSORPTION BY H2O Final Report, Jan. 1979 - Nov. 1981
Darrell E. Burch Mar. 1982 48 p refs
(Contract F19628-79-C-0041; AF Proj. 7670)
(AD-A112264; U-6696; AFGL-TR-81-0300) Avail: NTIS HC A03/MF A01 CSCL 07/4

Data on the H2O continuum absorption obtained by many different workers from laboratory samples and atmospheric paths are compared in the various windows in the infrared, millimeter-wave and microwave regions. Values of the continuum absorption coefficients calculated on the basis of simple, widely used line shapes may differ greatly from observed values in the windows between strong absorption lines. The temperature dependence of this absorption is also not predictable from present day understanding of line shapes or of dimers, which are thought by many to contribute. The shapes of self-broadened H2O lines are quite different from those of N2-broadened lines, and the difference increases with increasing distance from the centers of the lines. Several characteristics of the continuum absorption are common throughout the windows from the infrared to the microwave region. Author (GRA)

N82-28373# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
AN SCF-X ALPHA-SW MOLECULAR-ORBITAL STUDY OF A POSSIBLE REACTION PATH FOR ZIEGLER-NATTA CATALYSTS Interim Report
Anna C. Balaza and Keith H. Johnson 23 Mar. 1982 29 p refs
(Contract N00014-75-C-0970; Grant NSF DMR-78-24185; NR Proj. 056-596)
(AD-A113559; TR-15) Avail: NTIS HC A03/MF A01 CSCL 07/4

SCF-X alpha-SW molecular-orbital calculations for the coordination complex, (CH3TiCl4(C2H4))n = 0, -2, which is postulated to be an intermediate in Ziegler-Natta polymerization reactions, demonstrate that the energy gap between the lower-lying Ti-alkyl orbital and the higher Ti (3d sub yz) - olefin (pi*) orbital is sufficiently large (0.9ev for n = 0 and 1.5eV for n = -2) to make the Cossee mechanism for the propagation step seem unlikely. A series of calculations for CH3TiCl4(C2H4), where the alkyl and olefin groups are moved closer together in a sequence of concerted steps, suggest that this migration is a plausible mechanism for the polymerization reaction.
Author (GRA)

N82-28374# Massachusetts Inst. of Tech., Cambridge.
MONTE CARLO CALCULATIONS OF TWO-DIMENSIONAL COMBUSTOR FLOWS Final Report, 13 Jan. 1981 - 12 Jan. 1982
Stephen B. Pope 12 Apr. 1982 7 p refs
(Contract DAA929-81-K-0031)
(AD-A113780; ARO-17459.2-E) Avail: NTIS HC A02/MF A01 CSCL 21/2

Progress has been made in developing a computational procedure to calculate the properties of two-dimensional turbulent reactive flow fields appropriate to gas turbine combustors. The flow field is calculated by a standard finite-difference technique while a Monte Carlo method is used to solve the transport equation for the joint pdf of the species mass fractions. In the course of this project, a more accurate and efficient grid-free Monte Carlo method has been devised and an improved model of turbulent mixing has been developed. For plane constant-density flows, the Monte Carlo method has been implemented in a computer program. Author (GRA)

N82-28375# Pennsylvania Univ., Philadelphia. Solid State Electronics Lab.
SILVER-DOPING EFFECTS AND PHOTOSTRUCTURAL TRANSFORMATION IN EVAPORATED As2S3 THIN FILMS Final Report
Teh-Yi Chen, Jay N. Zemal, and Imant Lauks 16 Feb. 1982 220 p refs Sponsored in part by NSF
(AF Proj. 2306)
(AD-A113148; AFOSR-82-0120TR) Avail: NTIS HC A10/MF A01 CSCL 07/4

In this dissertation, one of the promising inorganic materials, the evaporated As2S3 film, is examined and their applications in microfabrications under the use of X-ray and electron-beam to induce the chemical responses are studied in Chapter 2. The compatabilities of As2S3 inorganic resists with advanced microfabrication processes, such as plasma etching, are studied in Chapter 3. In Chapter 4, the structural transformation of the As2S3 film upon band-gap illumination is examined. Work on the structural, optical and chemical properties of amorphous As2S3 films subjected to silver injection process by the electrochemical method will be studied in Chapter 5. GRA

N82-28376# Pennsylvania State Univ., University Park. Dept. of Chemistry.
CHARACTERIZATION OF SOLIDS AND SURFACES USING ION BEAMS AND MASS SPECTROMETRY
Nicholas Winograd Dec. 1981 98 p refs
(Contract N00014-80-C-0491; NR Proj. 051-744)
(AD-A112904; TR-4) Avail: NTIS HC A05/MF A01 CSCL 07/4

In this review, we will examine the possibility of utilizing energetic ion beams as tools to characterize the chemistry and structure of solids and surfaces. This approach may appear somewhat unusual to most spectroscopists who are generally concerned with the quantum mechanical interaction of electromagnetic radiation with matter. But, there have been a number of developments that have surfaced over the last few years which have attracted our attention to this particular field and which merit close consideration. Author (GRA)

N82-28377# Johns-Manville Sales Corp., Denver, Colo. Research and Development Center.
EFFECT OF OUTSIDE COMBUSTION AIR ON GAS FURNACE EFFICIENCY Final Report, 18 Sep. 1980 - 15 Oct. 1981
Thomas E. Brisbane and Kathleen L. Hancock Fort Belvoir, Virginia Army Facilities Engineering Support Agency 15 Oct. 1981 117 p

(Contract DAAK70-78-D-0002)
(AD-A113484; USAFESA-TS-2104) Avail: NTIS HC A06/MF A01 CSCL 13/1

Retrofit enclosure of gas furnaces to supply outside combustion and dilution air may save up to 6 percent of natural gas usage in cold climates. The cost effectiveness of this retrofit should be calculated for each opportunity as installed costs will vary widely depending on local building codes and furnace location. A freezing hazard exists for water heaters and lines which might be enclosed with furnace. GRA

N82-28378# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.

INVESTIGATIONS ON THE NATURE AND REACTIVITY OF COMPOUNDS FORMED BETWEEN LITHIUM AND CARBON BLACK

William P. Kilroy, Stanley D. James, and Jo Ann Milliken 1 Sep. 1981 30 p refs
(SF65571692)
(AD-A113116; AD-F500007; NSWC/TR-81-127) Avail: NTIS HC A03/MF A01 CSCL 07/4

Preliminary X-ray analysis of ground mixtures of lithium and carbon black and electrochemical studies of cathodized carbon black indicate the presence of Li-C compounds, probably intercalates. GRA

N82-28379# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.

ELECTROCHEMISTRY OF SULFUR DIOXIDE IN NONAQUEOUS SOLUTIONS, PART 1 Interim Report

Linda S. Laughlin 18 May 1981 40 p refs
(ZR01301)
(AD-A113033; AD-F500009; NSWC/TR-80-533) Avail: NTIS HC A03/MF A01 CSCL 07/4

A survey and discussion of published reports on the reduction of sulfur dioxide in nonaqueous solutions is presented as an introduction to the experimental plans and preliminary results contained in Part II. GRA

N82-28380*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE HIGH TEMPERATURE THERMOCHEMICAL PROPERTIES OF CARBON Interim Report

R. L. Baker (Aerospace Corp., El Segundo, Calif.) and M. A. Covington 31 Mar. 1982 97 p refs
(Contract F04701-81-C-0082)
(NASA-TM-84710; NAS 1.15:84710; AD-A112977; TR-0082(2729)-1; SD-TR-82-19) Avail: NTIS HC A05/MF A01 CSCL 07/4

A new method based on the combined use of carbon laser ablation data and analytical modeling has been used to determine carbon vapor pressure and vaporization coefficients at high temperatures (up to 4600 deg K). The JANAF carbon species C3 thermochemical data have been rejected in favor of alternate data. The JANAF data predict a total vapor pressure too low by a factor of greater than two at 4000 deg K. The melt temperature of carbon has been concluded to be greater than 4500 deg K using a surface reflectivity method. The temperature dependence of vaporization coefficients for carbon species has been determined for the first time from 3300 to 4600 K. Author (GRA)

N82-28381# York Univ., Downsview (Ontario). Dept. of Chemistry.

SENSITIZED PHOTO-REDUCTION OF METHYL VIOLOGEN BY METALLOPORPHYRINS

A. B. P. Lever, B. S. Ramaswamy, and S. Licoccia 1 May 1982 23 p refs Submitted for publication Sponsored in part by Natural Sciences and Engineering Research Council and the Bickell Foundation
(Contract N00014-78-C-0592; NR Proj. 051-693)
(AD-A114443; TR-18) Avail: NTIS HC A02/MF A01 CSCL 07/4

We report the sensitized photo-reduction of methyl viologen by a series of porphyrins and metalloporphyrins, by visible light, in the presence of triethanolamine. Electrochemical studies and absorption and emission spectra are used to identify the redox potentials of the relevant photo-excited states and to calculate thermodynamic driving forces for quenching and subsequent thermal reactions. Electron spin resonance data are used to confirm the occurrence of oxidative and/or reductive quenching in these various systems. In general, the quantum yields for methyl viologen reduction parallel the thermodynamic driving force in a regular manner. The complex (L) (OAc) Rh(III)TPP (L equal solvent molecule) is shown to be an effective catalyst, photoreducing methyl viologen via an oxidative pathway with a quantum yield as high as 51%. Lifetimes and quenching constants are also reported for these species. Author (GRA)

N82-28382# Rockwell International Corp., Canoga Park, Calif. Rocketdyne Div.

INORGANIC HALOGEN OXIDIZER RESEARCH Final Report, 1 Mar. 1979 - 28 Feb. 1982

K. O. Christe 21 Apr. 1982 258 p refs
(Contract N00014-79-C-0176)
(AD-A114196; RI/RD82-226) Avail: NTIS HC A12/MF A01 CSCL 07/3

A basic research program was carried out in the area of inorganic halogen oxidizers. The program resulted in 27 papers published in major technical journals, 12 papers presented at international and national meetings, and 6 issued and 4 pending U.S. patents. The main effort of this program was in the areas of nitrogen fluoride and halogen fluoride chemistry. Numerous new energetic NF4 salts were synthesized and characterized, among which was (NF4)2 XeF8, a compound with the highest known usable fluorine content (71.7 weight %). GRA

N82-28383# Sverdrup Technology, Inc., Arnold Air Force Station, Tenn.

HIGH RESOLUTION SPECTRAL ABSORPTION IN THE SHORT WAVELENGTH WING OF THE 2.7-MICROMETER WATER BAND AT 1,000 K Final Report, 4 Mar. - 15 Sep. 1980

Lauren M. Peterson (Environmental Research Inst. of Michigan) AEDC Apr. 1982 77 p refs
(AD-A114156; AEDC-TR-81-29; ERIM-149100-1-T) Avail: NTIS HC A05/MF A01 CSCL 09/2

High-temperature water vapor absorption measurements taken by Environmental Research Institute of Michigan in 1978 have been reduced and compared with computer-generated spectra based upon the Air Force Geophysics Laboratory line tabulation. The latter tabulation failed to predict numerous spectral lines, or, in many cases, did not predict them accurately. Although the scope of this particular effort allowed only a brief analysis of a few lines in a selected spectral interval, the analysis did show the data to be useful in providing values of line strength, line width (self-broadened), and lower state energy.
Author (GRA)

N82-28384# California Univ., Santa Barbara. Dept. of Chemistry.

THE USE OF A PERFECTLY CONDUCTING SPHERE TO EXCITE THE PLASMON OF A FLAT SURFACE. 1: CALCULATION OF THE LOCAL FIELD WITH APPLICATIONS TO SURFACE ENHANCED SPECTROSCOPY Interim Technical Report

P. K. Aravind and Horia Metiu Apr. 1982 49 p refs Submitted for publication
(Contract N00014-81-K-0598; NR Proj. 056-766)
(AD-A114278; TR-3) Avail: NTIS HC A03/MF A01 CSCL 07/4

We study the electromagnetic properties of a system consisting of a perfectly conducting sphere and a dielectric half-space driven by a laser. We show that the local field in the space between the sphere and the plane is strongly enhanced, making the system an interesting candidate for surface enhanced spectroscopy. The dependence of the local field on the incident frequency and the spatial distribution of the enhancement factor are presented. Possible applications are discussed.
Author (GRA)

N82-28385# California Univ., Santa Barbara. Dept. of Chemistry.

SURFACE ENHANCED SPECTROSCOPY Interim Technical Report

Horia Metiu Jan. 1982 281 p refs Submitted for publication

(Contract N00014-81-K-0598; NR Proj. 056-766)
(AD-A114274; TR-2) Avail: NTIS HC A13/MF A01 CSCL 07/4

We review the physical processes occurring when solid surfaces are used to modify in a substantial way the spectroscopic properties of molecules located nearby. This is achieved by enhancement of the local laser field, increase in molecular emission, and decrease in excited state life-time. We survey the use of flat surfaces, gratings, attenuated total reflection prisms, surfaces with small and large random roughness, isolated spheres and ellipsoids, and interacting solid surfaces. The spectroscopic techniques surveyed are surface enhanced Raman, fluorescence, resonant Raman and absorption. The possibility of enhancing photochemical processes is also discussed. We have made an effort to present all these topics from an unifying point of view and to survey the experiments relevant to the concepts presented. The level of presentation is aimed at a non-expert or an experimentalist without extensive theoretical skills. GRA

N82-28386# Harvard Univ., Cambridge, Mass. Lab. of Microbial Ecology.
THE ROLE OF MICROORGANISMS IN MARINE CORROSION PROCESSES Annual Technical Report, 1 Jul. 1981 - 30 Jun. 1982
Ralph Mitchell and Paul J. Boyle May 1982 38 p refs
(Contract N00013-81-K-0624; NR Proj. 205-043)
(AD-A114424; ATR-1) Avail: NTIS HC A03/MF A01 CSCL 06/13

This report describes research into the role of bacteria in marine corrosion processes. During the past year we have developed methods for quantitative assessment of bacterial attachment and growth on metal surfaces. We have shown that few marine bacteria attach to metals coated with organic films. However, these bacteria quickly adapt to the new environment and grow rapidly. We are currently developing methods to assay organic acid production by these bacteria at crack and crevice corrosion sites. High pressure liquid chromatography is being used for these analyses. Author (GRA)

N82-28387# Naval Research Lab., Washington, D. C.
GAS-SOLID REACTIONS. PART 1: EXTERNAL DIFFUSION-CONTROLLED REACTIONS Interim Report
H. D. Ladouceur and R. R. Smardzewski 28 Apr. 1982 27 p refs
(AD-A114086; NRL-MR-4814-Pt-1) Avail: NTIS HC A03/MF A01 CSCL 07/2

A mathematical model is formulated to describe an exothermic gas-solid surface reaction, the rate of which is governed by reactant transport at low flow velocities through a variable property gas boundary layer. The total available reaction time and the effects of convective and radiative energy losses on the steady state temperature of the system are calculated for the oxidation of a graphitic carbon slab. Author (GRA)

N82-28388# Los Alamos Scientific Lab., N. Mex.
CATALYTIC COAL CONVERSION SUPPORT: USE OF LASER FLASH-PYROLYSIS FOR STRUCTURAL ANALYSIS Progress Report, 1 Jan. - 31 Mar. 1980
C. K. Rofer-DePoorter, comp., W. J. Verzino, Jr., R. E. Hermes, B. A. Nichols, and N. E. Vanderborgh Oct. 1981 6 p refs
(Contract W-7405-eng-36)
(DE82-004179; LA-9031-PR) Avail: NTIS HC A02/MF A01

Catalysts for the gasification of coal, because high temperatures are required for useful rates in uncatalyzed gasification were studied. Metal salt and oxide catalysts were investigated to allow gasification to proceed at reasonable rates at lower temperatures. Laser pyrolysis of coal, and examination of the pyrolysis products by a combination of gas chromatography and mass spectroscopy, contributes to understanding the changes that take place in coal upon treatment with catalysts. The products of laser pyrolysis are likely to be more representative of the original structure of the material pyrolyzed and other pyrolysis products. Coals are pulverized and treated with various catalysts, then heat treated in various atmospheres at different temperatures, and the resulting char is pyrolyzed to examine changes that take place during processing. The amounts of H2, CO, CH4, H2O, CO2, and C2H2 in the pyrolysis products varies with varying treatment. Amounts of H2O and CO generated decrease with increasing processing temperature. With steam processing, greater amounts of CO, CO2, and H2O are generated in the pyrolysis. DOE

N82-28389# Pennwalt Corp., King of Prussia, Pa. Research and Development Dept.
PELLETIZATION AND ROLL ENCAPSULATION OF PHASE-CHANGE MATERIALS
Johnson Cher. 1981 10 p refs Presented at Ann. Contractors' Rev. Meeting on Thermal and Chem. Storage, Washington, D.C., 14-16 Sep. 1981
(Contract W-7405-eng-26)
(DE82-000162; CONF-810940-17) Avail: NTIS HC A02/MF A01

Based on the criteria of high latent heats of fusion, low cost, and ease of pelletization, seven phase change materials (PCMs) with melting points in the ranges suitable for absorption cooling, active heating, and passive space conditioning applications were pressed into pellets about 12 mm in diameter and then encapsulated with organic coating materials by a roll coating process. Capsules of four of the seven PCM candidates showed retention of integrity in various aqueous heat exchange fluids in accelerated thermal cycling tests ranging between 1500 to 2900 heating and cooling cycles. Capsules of PCMs melting near room temperature showed good stability in laboratory air environment. Reliable and cost effective PCMs were developed for use in: (1) active heat exchange packed bed assemblies of simple design that are capable providing heat exchange efficiency and storage capacity superior to those of conventional heat storage systems, and (2) passive heat storage systems consisting of building products incorporating thermal energy storage materials. DOE

N82-28390# Los Alamos Scientific Lab., N. Mex.
CATALYTIC COAL CONVERSION SUPPORT: USE OF LASER FLASH-PYROLYSIS FOR STRUCTURAL ANALYSIS Progress Report, 1 Jan. - 31 Mar. 1981
G. A. Bennett, C. K. Rofer-DePoorter, W. J. Verzino, Jr., R. E. Hermes, and L. F. Gritzo Oct. 1981 18 p refs
(Contract W-7405-eng-36)
(DE82-004180; LA-9034-PR) Avail: NTIS HC A02/MF A01

The apparatus for on-line sampling of gases generated during processing of coal with catalysts was checked out with coal processed without catalysts. Gases monitored by gas chromatography are N2, O2, H2, CH4, CO, CO2, C2H4, and C2H6. Most of the gaseous products are liberated in the first hour of processing. Condensates are also collected for later analysis by GC/MS. Reproducibility of the method is being improved. A method is being developed to compare pyrograms quantitatively. Coals and chars are pyrolyzed for 1.0 s at a laser power of 20 W, with the spot focussed to 2.5 mm as standard conditions. The total abundances of about forty compounds are then tabulated and subjected to a statistical analysis of variance. The compounds include alkanes, alkenes, aromatics, and sulfur, oxygen, and nitrogen compounds. The statistical analysis is now being performed for untreated Fruitland coal, and for Fruitland coal treated with CO2 at 4000 C and the catalysts NaHCO3, Na2CO3, and K2CO3. Extensive transient heat transfer analysis was performed to model the laser pyrolysis event. DOE

N82-28391# Los Alamos Scientific Lab., N. Mex.
CATALYTIC COAL CONVERSION SUPPORT: USE OF LASER FLASH PYROLYSIS FOR STRUCTURAL ANALYSIS Progress Report, 1 Apr. - 30 Jun. 1980
C. K. Rofer-DePoorter, comp., W. J. Verzino, Jr., R. E. Hermes, and N. E. Vanderborgh Oct. 1981 6 p
(Contract W-7405-eng-36)
(DE82-004176; LA-9032-PR) Avail: NTIS HC A02/MF A01

Acid lignin was pyrolyzed and the pyrolysis products were analyzed on the HP model 5830 GC/MS to understand the pyrolysis process. The lignin was pyrolyzed with the Nd laser and the CO2 laser, yielding significantly different pyrograms. Pyrolysis with the Nd laser yielded more than 30 products of which the major components are diacetylene and methoxyphenol. Pyrolysis with the CO2 laser yielded more than 96 compounds. The CO2 laser produced several sulfur containing organics not observed with the Nd laser. The Nd laser produced acetylenic compounds not observed with the CO2 laser. Similar aromatic

and phenolic compounds are observed with both lasers. The presence of indene, naphthalene, and benzothiophene in the lower energy CO2 laser pyrolysis indicates that some ring closing reactions are taking place. It is suggested that the greater amounts of acetylenic compounds produced by the Nd laser are a result of the higher laser energy deposition. DOE

N82-28392# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
CHEMISTRY AND MORPHOLOGY OF COAL LIQUEFACTION Annual Report, 1 Oct. 1980 - 20 Sep. 1981
Heinz Heinemann Sep. 1981 48 p refs
(Contract W-7405-eng-48)
(DE82-005141; LBL-13318) Avail: NTIS HC A03/MF A01

Progress in coal liquefaction processes is discussed. Six tasks are reported: selective synthesis of gasoline range components from synthesis gas; electron microscopic studies of coal during hydrogenation; catalyzed low temperature hydrogenation of coal; selective hydrogenation, hydrogenolysis, and alkylation of coal and coal liquids by organometallic systems; chemistry of coal solubilization and liquefaction; and coal conversion catalyst deactivation. DOE

N82-28393# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Chemistry.
PHOTOCATALYTIC HYDROGEN PRODUCTION FROM WATER AND INTERMETALLIC COMPOUND FORMATION ON SINGLE-CRYSTAL SURFACES OF TITANIUM OXIDES Ph.D. Thesis
Frederick Tadeusz Wagner Sep. 1981 334 p refs
(Contract W-7405-eng-48)
(DE82-004952; LBL-13634) Avail: NTIS HC A15/MF A01

The photocatalytic and photoelectrochemical properties of SrTiO3 surfaces were studied in different gas and liquid phase environments. Platinized SrTiO3 crystals catalyzed the dissociation of water to hydrogen and oxygen when illuminated with bandgap radiation in aqueous alkaline electrolytes or in water vapor when covered by films of basic deliquescent compounds. All chemistry occurred on the illuminated surface of the semiconductor. Photoactivity on metalfree surfaces also increased at higher hydroxide concentrations. The mechanisms by which both surface and electrolyte hydroxide species can promote photocatalysis at the gas-solid interface were explored. The differences between the catalysis of water photodissociation at the liquid-solid and gas-solid interfaces are discussed. Auger peak shape changes for Pd films correlated with metal particle size. Auger electron attenuation data were used for the determination of film morphology. DOE

N82-28394# Ames Lab., Iowa. Dept. of Chemical Engineering.
KINETICS OF THE REVERSE DEACON REACTION Ph.D., Thesis
Arun K. Nanda Oct. 1981 157 p refs
(Contract W-7405-eng-82)
(DE82-005621; IS-T-978) Avail: NTIS HC A08/MF A01

The kinetics of the chlorination of water vapor at high temperatures was investigated. An eleven pass glass reactor 4 mm ID and 511 mm long was used. Stimulus response experiments showed the reactor could be analyzed by plug flow procedures. The rate expression was verified by the integral approach and the results were extended to two other temperatures. The parameters of the rate expression were obtained by a linear least square fit. The frequency factor and activation energy were determined for the reverse Deacon reaction. These parameters were verified with the theoretical values from collision theory and activated complex theory. A mechanism consistent with one of the limiting conditions was postulated. The effects of the flow rates of the reactants and temperature on conversion of chlorine were analyzed statistically. DOE

N82-28395# Ames Lab., Iowa.
STUDY OF HYDROGEN IN COALS, POLYMERS, OXIDES, AND MUSCLE WATER BY NUCLEAR MAGNETIC RESONANCE: EXTENSION OF SOLID STATE HIGH RESOLUTION TECHNIQUES Ph.D. Thesis
Larry Michael Ryan Oct. 1981 242 p refs
(Contract W-7405-eng-82)
(DE82-005454; IS-T-957) Avail: NTIS HC A11/MF A01

Nuclear magnetic resonance (NMR) spectrosopy of solids was investigated. High resolution solid state 13C NMR spectra exhibiting features similar to those observed in liquids are currently achievable using sophisticated pulse techniques. Analogous methods for high resolution 1H NMR of rigid solids are developed. Applications include characterization of hydrogen aromaticities in fossil fuels, and studies of hydrogen in oxides and bound water in muscle. DOE

N82-28396# Ames Lab., Iowa.
COORDINATION CHEMISTRY OF SEVERAL RADIUS-SENSITIVE COMPLEXONES AND APPLICATIONS TO LANTHANIDE-ACTINIDE SEPARATIONS Ph.D. Thesis
Michael Wayne Potter Oct. 1981 138 p refs
(Contract W-7405-eng-82)
(DE82-005547; IS-T-940) Avail: NTIS HC A07/MF A01

The relationships between the lanthanide complex formation equilibria and the lanthanide actinide separation application of three radius sensitive ligands were studied. The consecutive stepwise formation constants of the 1:1, 2:1, and 3:1 chelate species formed by the interaction of DHDMB and the tripositive lanthanides and yttrium were determined potentiometrically at 0.1 M ionic strength and 250 C. Results indicate that three different coordination modes, one tridentate and two bidentate are in evidence. Tracer level Am-241 Eu-155 cation exchange experiments utilizing DHDMB eluents indicate that this dihydrox carboxylate does not form a sufficiently strong americium complex to elute that actinide ahead of europium. The overall stability of the americium 3:1 complex appears intermediate between samarium and europium. Cation exchange elutions of Am-241, Eu-155, and Tb-160 mixtures with EEDTA solutions prove that the EEDTA ligand is capable of eluting americium ahead of all of the tripositive lanthanide cations. DOE

N82-28397# Ames Lab., Iowa.
KINETIC STUDIES OF ORGANOCHROMIUM (3) CATIONS AND THEIR HYDRIDO ANALOG Ph.D. Thesis
Debra Ann Piering Ryan Oct. 1981 264 p refs
(Contract W-7405-eng-82)
(DE82-005581; IS-T-956) Avail: NTIS HC A12/MF A01

The kinetics of the reaction of the complex (CH3) 2CHCr (H2O)5(2) with molecular oxygen, in aqueous perchloric acid, were investigated primarily by spectrophotometry. A free-radical chain mechanism is proposed. The principal products of the autoxidation (acetone and Cr(H2O)6(3)) accounted for by rapid protonolysis of the isopropylperoxochromium (III) intermediate. The complex HOCH2CH2Cr(H2O)5(2) was prepared in dilute aqueous perchloric acid, by the photochemical generation of (ALPHA)-hydroxyethyl radicals in the presence of Cr/sub aq/(2). The products of the reaction are ethylene and Cr(H2O)6(3), consistent with a rate-limiting step of proton assisted beta-elimination of a water molecule to form a highly unstable (LCOMEGA)-bonded C2H4Cr(H2O)(3) intermediate. The complex HCr(H2O)5(2) was made by the uv flash photolysis of aqueous chromium(II) perchlorate and its reaction with H3O( ) (to form H2 and Cr(H2O)6(3) investigated. DOE

N82-28398# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ELECTRICAL CHARACTERIZATION OF SILICON PRODUCED BY ELECTROCHEMICAL PURIFICATION Progress Report, Jun. 1980 - Oct. 1981
Alan E. Kibbler Dec. 1981 44 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-005105: SERI/TP-212-1489) Avail: NTIS HC A03/MF A01

A procedure and methodology for the electrical characterization of small single crystal and polycrystalline silicon specimens are described. The tested material is manufactured by electrowinning or electrorefining processes in quantities ranging from 10 to 1000 milligrams. The material's potential for application in solar cell fabrication is indicated. The minimum measurement format includes: majority carrier type, resistivity, minority carrier diffusion length, minority carrier lifetime, Hall mobility, and Hall carrier density. The methods are proven to be reasonably reliable, reproducible (allowing for experimental variances), and usually successful in obtaining reportable results. The beginnings of device

fabrication and measurement are investigated, which include: Schottky diodes, diffused junction diodes, MOS structures, conventionally diffused photocells, and ITO or SnO2 photocells. DOE

N82-28399# Oak Ridge National Lab., Tenn. Analytical Chemistry Div.
THERMAL ANALYSIS OF SYNROC GEL MICROSPHERES
Kay E. Knipschild (Central Methodist College, Fayette, Mo.) and Dewey A. Lee Nov. 1981 24 p refs
(Contract W-7405-eng-26)
(DE82-003472; ORNL/TM-7930) Avail: NTIS HC A02/MF A01

Thermoanalytical methods were used to characterize SYNROC microspheres at three stages of the internal gelation process: unwashed spheres, washed spheres, and washed and dried spheres. Linear programmed heating experiments were performed using the thermogravimetric analysis, differential scanning calorimetry, differential thermal analysis, and mass spectrometry for producing the thermograms. The data were used to elucidate thermal reactions occurring between ambient and 8000 C. The principal reactions were the release of waters from various sources, the decomposition and combustion of gelation additives (hexamethylenetetramine and urea), and the decomposition of carbonates. Data also demonstrated the efficiency of the washing process. Kinetic studies were carried out by differential scanning calorimetry and differential thermal analysis to determine activation energies for certain pyrolysis reactions. DOE

N82-28400# Oak Ridge National Lab., Tenn.
RECENT PROGRESS IN MAJOR COAL LIQUEFACTION FACILITIES: OVERVIEW REPORT NO. 2
K. H. Lin, J. F. Fisher, A. R. Irvine, and F. M. OHara, Jr. Dec. 1981 94 p refs
(Contract W-7405-eng-26)
(DE82-004656; ORNL/TM-8025) Avail: NTIS HC A05/MF A01

Reviews and evaluations of significant developments in four major coal liquefaction projects (SRC-I, SRC-II, EDS and H-Coal) are presented. The main sources of information were (1) progress reports from major coal liquefaction facilities, (2) technical review meeting memos, and (3) SRC-I and SRC-II demonstration plant status review meeting memos. A summary of important developments is presented as the basis for an assessment of the significance of these developments in coal liquefaction, as well as more detailed information to provide a supporting data base for the technical assessment. DOE

N82-28401# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
PERFORMANCE ASSESSMENT OF MATERIALS AND COMPONENTS OF THE WESTINGHOUSE COAL GASIFICATION PROCESS DEVELOPMENT UNIT
J. P. Hammond and J. R. Horton Dec. 1981 35 p refs
(Contract W-7405-eng-26)
(DE82-005995; ORNL/TM-8037) Avail: NTIS HC A03/MF A01

A preliminary assessment of the performance of materials and components of the Westinghouse Process Development Unit (PDU) at Waltz Mill, Pennsylvania is given. The assessment was accomplished by evaluating information in the literature and discussing performance problems with the operating personnel of the PDU. The materials and components problems at the Westinghouse plant are not especially pressing from the viewpoint of its successful operation; however, several areas require increased effort for the orderly development of a viable commercial process. Such areas include (1) an efficient waste heat recovery system for the product gas stream, (2) elimination of a solids sticking problem in the off-gas cyclone consistent with high thermal efficiency, (3) a high-temperature solids feeder for recycle char capable of operation at 6500 C, and (4) a fusion-bonded protective ceramic overlay approach to provide long-life service of the combustor feed tube. DOE

N82-28402# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Chemistry.
EXPERIMENTAL NUCLEAR AND RADIOCHEMISTRY Progress Report, 1981
Paul J. Karol Sep. 1981 59 p refs
(Contract DE-AS02-78ER-04721)
(DE82-002925; DOE/ER-04721/5) Avail: NTIS HC A04/MF A01

Research progress is reported on the following topics: (1) the importance of classical nucleon-nucleon spatial correlations on nuclear interactions; (2) mathematical development of properly behaved skewed Gaussian function; (3) cluster interactions and true pion absorption; and (4) anomalous relativistic heavy ion projectile fragments. DOE

N82-28403# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.
COUPLING OF TRANSPORT AND CHEMICAL PROCESSES IN CATALYTIC COMBUSTION Final Report
F. V. Bracco and P. M. Curtis 30 Nov. 1981 133 p refs
(Contract DE-AC21-80MC-14036)
(DE82-006267; DOE/MC-14036/T1; FE-2762-8) Avail: NTIS HC A07/MF A01

The elucidation of the mechanism of high temperature catalytic oxidation of elementary hydrocarbon fuels and fuel constituents was studied. A two dimensional steady state model was developed and includes axial and radial convection and diffusion of mass, momentum and energy, as well as homogeneous and heterogeneous single step irreversible chemical reactions. The model predicts axial and radial gas temperature and composition profiles within a catalyst channel, for comparison with experimental measurements at the catalyst outlet. The effects of radiative heat transfer and the temporal response of the catalyst at ignition are also incorporated in the model. Carbon monoxide and medium Btu gas combustion in the presence of a platinum catalyst supported on a monolithic cordierite honeycomb substrate were investigated. Axial profiles of substrate temperature, gas temperature and gas composition were determined at different gas velocities, equivalence ratios and inlet preheat temperatures. DOE

N82-28404# Wayne State Univ., Detroit, Mich.
INTEGRATED APPROACH TO THE SYSTEMATIC SYNTHESIS, CHARACTERIZATION, AND CATALYTIC ACTIVITY OF NOVEL HETEROGENEOUS CATALYSTS Final Progress Report
Alan Brenner 13 Nov. 1981 23 p refs
(Contract DE-AS02-79ER-10381)
(DE82-004898; DOE/ER-10381/3) Avail: NTIS HC A02/MF A01

The surface chemistry and catalytic activity of a new class of heterogeneous catalysts, carbonyl complexes directly deposited on high surface area inorganic supports was investigated. A highly efficient characterization technique, temperature programmed decomposition (TPDE) was employed coupled with automated activity measurements. TPDE spectra of all elements which have carbonyl complexes was obtained, including a variety of cluster and mixed metal complexes. These spectra contain quantitative information on the stoichiometry and oxidation state of the catalysts at each stage of activation. Extensive chemisorption data were also obtained. Each of the catalysts was tested for several model reactions: ethylene hydrogenation, ethane hydrogenolysis, and methanation. DOE

N82-28405# Massachusetts Inst. of Tech., Cambridge.
REDUCTION OF CARBON MONOXIDE. PAST RESEARCH SUMMARY Progress Report, 1 Jun. 1980 - 31 May 1982
Richard R. Schrock 1982 90 p refs
(Contract DE-AS02-78ER-04949)
(DE82-007524; DOE/ER-04949/1) Avail: NTIS HC A05/MF A01

The preparation, characterization, and reactions of binuclear tantalum complexes are described. Reactions with dimeric molecules show: (1) the dimer does not break into monomers under mild conditions; (2) intermolecular hydride exchange is slow; (3) intermolecular nonionic halide exchange is fast; (4) the ends of the dimers rotate partially with respect to one another. The binuclear tantalum hydride complexes were found to react with carbon monoxide to give a molecule which is the only example of reduction of CO by a transition metal hydride to give a complex containing a CHO ligand. Isonitrides also reacted in a similar manner with dimeric tantalum hydride. DOE

N82-28406# Ames Lab., Iowa.
ELECTROCATALYSIS OF THE OXIDATIONS OF SOME ORGANIC COMPOUNDS ON NOBLE-METAL ELECTRODES BY FOREIGN-METAL AD-ATOMS Ph.D. Thesis
Ronald W. Tsang Oct. 1981 254 p refs
(Contract W-7405-eng-82)
(DE82-005619; IS-T-980) Avail: NTIS HC A12/MF A01

Electrochemical oxidation of formic acid was studied on Pt electrodes in acid, and that of dextrose was studied on Pt and Au in alkali. Poisoning was observed on Pt but not on Au. Several heavy metal ad-atoms (Pb, Bi, Tl) enhance greatly the anodic currents on Pt, while transition metals (Cu, Zn) inhibit the oxidation on Pt. The enhancement effect of the metal ad-atoms is correlated with electron structure. All metal ad-atoms showed an inhibitory effect on Au. Amperometry showed that Pt electrodes are completely deactivated within 10 s during dextrose oxidation without ad-atoms, while Au retains much of its activity even after 10 min. Ad-atoms maintains the Pt activity over much more than 10 s. DOE

N82-28407# Minnesota Univ., Minneapolis. Dept. of Chemical Engineering and Materials Science.
STUDIES IN CHEMICAL REACTIVITY Progress Report, 30 Nov. 1980 - 1 Dec. 1981
Robert W. Carr, Jr. 1981 34 p refs
(Contract DE-AS02-76ER-02026)
(DE82-006891; DOE/ER-02026/41) Avail: NTIS HC A03/MF A01

The photooxidation of 1,3-dichloro tetralfuoro acetone was investigated. Measurements of product quantum yields led to a mechanism for the reaction of CF2Cl radicals with O2, and gave evidence for the reaction of CF2ClO radicals with CO to produce CO2. The flash photolysis of 1,3-dichloro tetrafluoro acetone was studied, with emphasis placed on spectroscopic observations of the rate of formation of ClO. The flash photolysis of ketene was also investigated with detection of products and transient species by time resolved mass spectrometry. The kinetics and mechanisms CH23B1 reactions are studied, and an experiment to detect luminescence from CH21B1, where CH21B1 is produced by pulsed laser photolysis of diazomethane, was set up. An analysis of a photochemical smog mechanism by variational sensitivity analysis was done. A preprint on photolysis of 1-iodopropane is included. DOE

N82-28408# National Bureau of Standards, Washington, D.C. Chemical Thermodynamics Div.
OCTANOL/WATER PARTITION COEFFICIENTS AND AQUEOUS SOLUBILITIES OF ORGANIC COMPOUNDS
Stanley P. Wasik, Yadu B. Tewari, Michele M. Miller, and Daniel E. Martire (Georgetown Univ.) Dec. 1981 68 p refs
(Contract EPA-80-X0985)
(PB82-141797; NBSIR-81-2406) Avail: NTIS HC A04/MF A01 CSCL 07D

A generator column method for measuring the octanol/water partition coefficient k sub O/w and the aqueous solubility, c(w) sub s is described. When water is pumped through a generator column packed with solid support coated with an organic stationary phase, an aqueous solution is generated that is in equilibrium with the stationary phase. The solute concentration in the eluted aqueous phase was measured either by high pressure liquid chromatography or by solvent extraction followed by gas chromatographic analysis. Aqueous solubilities and octanol/water partition coefficients of organic solutes, falling into 7 general chemical classes, have been systematically determined using the modified generator column method. From thermodynamics an equation is derived relating k sub O/w to the volume-fraction-based solute activity coefficient in water gamma sub w sub s, the latter being determinable from c(w) sub s. GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N82-28409*# Purdue Univ., Lafayette, Ind. Dept. of Material Engineering.
EFFECTS OF COBALT ON THE MICROSTRUCTURE OF UDIMET 700 M.S. Thesis Final Report
Mayer Abraham Engel Jun. 1982 66 p refs
(Grant NAG3-57)
(NASA-CR-165605; NAS 1.26:165605) Avail: NTIS HC A04/MF A01 CSCL 11F

Cobalt, a critical and 'strategic' alloying element in many superalloys, was systematically substituted by nickel in experimental alloys Udimet 700 containing 0.1, 4.3, 8.6, 12.8 and the standard 17.0 wt.% cobalt. Electrolytic and chemical extraction techniques, X-ray diffraction, scanning electron and optical microscopy were used for the microstructural studies. The total weight fraction of gamma' was not significantly affected by the cobalt content, although a difference in the size and quantities of the primary and secondary gamma' phases was apparent. The lattice parameters of the gamma' were found to increase with increasing cobalt content while the lattice mismatch between the gamma matrix and gamma' phases decreased. Other significant effects of cobalt on the weight fraction, distribution and formation of the carbide and boride phases as well as the relative stability of the experimental alloys during long-time aging are also discussed. Author

N82-28410 National Physical Lab., Teddington (England). Div. of Materials Applications.
THE EFFECT OF HEAT TRANSFER ON THE DIFFUSION-LIMITED CATHODIC REDUCTION OF OXYGEN ON STEEL IN FLOWING 3.2 PERCENT SODIUM CHLORIDE SOLUTION
P. E. Francis and A. Dolphin Jan. 1982 16 p refs Sponsored by UK Dept. of Energy
(NPL-DMA(A)-38; ISSN-0143-7313) Copyright. Avail: NTIS HC A02/MF A01

An apparatus for studying the effect of heat transfer on the electrochemical behavior of steel in flowing saline solutions was developed. Oxygen reduction on hollow cylindrical specimens was studied at 19.5 C solution temperature. Linear flow velocities past the specimen in the range 0 to 28 cm/sec were used with surface temperatures up to 90 C. In stagnant solution, heat transfer induces natural convective flow around the specimen, which significantly increases the diffusion limited current density for oxygen reduction (IL). Increasing the surface temperature of the steel from 20 to 70 C increases IL tenfold. With a flow velocity > 5.5 cm/sec, natural convection has little effect on IL. The value of IL doubles when the surface of the specimen is raised from 20 to 70 C. In flowing solutions, the increase in the value of IL with surface temperature can be quantitatively accounted for in terms of Arrhenius effects on the diffusion coefficient for oxygen. Author (ESA)

N82-28411# National Bureau of Standards, Washington, D.C. Metallurgy Div.
APPLICATION OF SOLIDIFICATION THEORY TO RAPID SOLIDIFICATION PROCESSING Semiannual Technical Report, 1 Apr. - 30 Sep. 1981
W. J. Boettinger, J. W. Cahn, S. R. Coriell, J. R. Manning, and R. J. Schaefer Feb. 1982 49 p refs
(ARPA Order 3751)
(AD-A112864) Avail: NTIS HC A03/MF A01 CSCL 13/8

The objective of this work is to develop guidelines based on kinetic and thermodynamic solidification theory for prediction and control of rapid solidification processes. In particular, segregation effects and rules governing the formation of equilibrium and non-equilibrium phases, including metallic glasses, will be investigated. Areas where significant improvements in alloy properties can be produced by rapid solidification will be emphasized. GRA

N82-28412# Army Materials and Mechanics Research Center, Watertown, Mass. Metals Research Div.
ANISOTROPIC EMBRITTLEMENT IN HIGH-HARDNESS ESR 4340 STEEL FORGINGS Final Report
Gregory B. Olson, Albert A. Anctil, Thomas S. DeSisto, and Eric B. Kula Jan. 1982 27 p refs
(DA Proj. 1L1-62105-AH-84)
(AD-A113906; AMMRC-TR-82-1) Avail: NTIS HC A03/MF A01 CSCL 11/6

ESR 4340 steel forgings tempered to a hardness of HRC

55 exhibit a severe loss of tensile ductility in the short transverse direction which is strain-rate and humidity dependent. The anisotropy is also reflected in blunt-notch Charpy impact energy, but is absent in the sharp-crack fracture toughness. Brittle behavior is associated with regions of smooth intergranular fracture which are aligned with microstructural banding. Scanning Auger microprobe analysis indicates some intergranular segregation of phosphorus and sulfur in these regions. The anisotropic embrittlement is attributed to an interaction of nonequilibrium segregation on solidification with local equilibrium segregation at grain boundaries during austenitizing. This produces defective regions of enhanced intergranular impurity segregation which are oriented during forging. The regions are prone to brittle fracture under impact conditions and abnormal sensitivity to environmental attack during low strain-rate deformation. A relatively sparse distribution of these defects (100 per cu. in.) accounts for the discrepancy between smooth bar and blunt-notch tests versus sharp-crack tests. Isotropic properties are restored by homogenization treatment. For application of these steels at extreme hardness levels, homogenization treatment is essential.

Author (GRA)

N82-28413# Naval Postgraduate School, Monterey, Calif.

THE INFLUENCE OF SOLUTION TREATMENT TIME AND QUENCH RATE ON MICROSTRUCTURE AND MECHANICAL PROPERTIES OF HIGH MAGNESIUM ALUMINUM MAGNESIUM ALLOYS M.S. Thesis

Reuben H. Shirah Dec. 1981 60 p refs

(AD-A113826) Avail: NTIS HC A04/MF A01 CSCL 11/6

Aluminum alloys containing 8-10 wt pct magnesium with further minor additions of Cu and Mn were solution treated for either 10 hours or 24 hours and subsequently quenched in either oil or water. Microstructural analysis by transmission electron microscopy and optical microscopy demonstrated that a 24-hour solution treatment when followed by water quenching was effective in retention of Mg in solution promoting more uniform precipitation during subsequent warm rolling, especially in an alloy containing 8.14 wt pct Mg-0.41 wt pct Cu. Tension and fatigue testing revealed improved fatigue resistance for this alloy when comparison was made to shorter solution treatment times and less severe quench conditions. The addition of Mn, possibly in conjunction with increased solution treatment temperature, appears to be especially effective in development of a homogeneous microstructure; an alloy containing 10.2 wt pct Mg-0.52 wt pct Mn exhibited a yielded strength of 398 Mpa (57.8 Ksi), a tensile strength of 455 Mpa (75.8 Ksi) with 11 pct elongation to fracture.

Author (GRA)

N82-28414# Naval Postgraduate School, Monterey, Calif.

A STUDY OF THE BREAKDOWN MECHANISM OF AISI 304 STAINLESS STEEL, TYPE 2024 ALUMINUM AND VARIOUS TITANIUM COATINGS M.S. Thesis

Michael Howard Beelby and Henry George Ulrich, III Dec. 1981 58 p refs

(AD-A113831) Avail: NTIS HC A04/MF A01 CSCL 11/3

An investigation, experimental and theoretical, into the breakdown mechanisms and associated minimum power levels required for the breakdown and unipolar arcing was conducted for AISI 304 stainless steel and Type 2024 aluminum. The experiment was conducted using a neodymium-glass Q-switched laser. A system of filters was used to attenuate the irradiance on target to the point at which no damage was discernible following laser-target interaction. Experimental results show that above a certain critical power density, surface breakdown occurs. The primary mechanism of surface damage at the power density threshold is by unipolar arcing. Titanium coated stainless steels were exposed to energy density levels on the order to 5 GW/sq cm. The titanium coatings significantly reduced or eliminated the number of unipolar arcs observed. A model is proposed for the physical processes involved in the first few nanoseconds before breakdown.

GRA

N82-28415# Lockheed-Georgia Co., Marietta.

EVALUATION AND HANDBOOK DATA OF 7050 RIVETS, VOLUME 1 Final Report, Jul. 1979 - Aug. 1981

Eddie J. Bateh Wright-Patterson AFB, Ohio AFWAL Dec. 1981, 125 p refs

(Contract F33615-79-C-5030; AF Proj. 2418)

(AD-A113380; LG81FR0095; AFWAL-TR-81-4168-Vol-1) Avail: NTIS HC A06/MF A01 CSCL 13/5

The aluminum alloy 7050 wire has been represented by Alcoa as a high strength, easily upsetable and corrosion compatible rivet material. Rivets made from this alloy and heat treated to the overaged T73 temper, indicate a high shear strength. Fsu = 43 Ksi (driven condition). The rivets were also found to be corrosion compatible and with no stress corrosion failure in the alloy wire when subjected to a stress equal to 75% of yield strength (Fty = 63 Ksi) for 30 days in salt solution. The joint fatigue data compared favorably with that of 2024-T31DD (ice box) rivet in both low load and medium load transfer configuration tests. The shear strength of 7050-T73 rivet was also compared to the 2219-T81 rivet at elevated temperatures 250 and 350 F and 16, 96, 288 hour soak. It was determined that the 7050 rivet can replace the 2219 rivet in the temperature environment. The maximum reduction of room temperature strength was realized at the 350 F and 288 hour soak test conditions. This reduction was 42% for 7050-T73 rivet as compared 34% for 2219-T81 rivet.

GRA

N82-28416# Materials Research Lab., Inc., Glenwood, Ill.

EFFECT OF DEFECTS IN ALUMINUM P/M Final Technical Report, Aug. 1980 - Sep. 1981

J. S. Santner Wright-Patterson AFB, Ohio AFWAL Dec. 1981 109 p refs Presented at the AIME Ann. Meeting, Dallas, 14-18 Feb. 1982

(Contract F33615-80-C-5089; AF Proj. 2418)

(AD-A113134; Rept-791) Avail: NTIS HC A06/MF A01 CSCL 11/6

No previous work on the first generation P/M aluminum alloys studied whether foreign contaminants were limiting the potential of these materials. The present program conducted fatigue tests on a forging, an extrusion, and an as-compacted billet of the CT 91 (formerly MA 87) composition. Specimens taken from both the L and L-T orientations were tested with fatigue lives between 1,000 and 1,000,000 cycles. Specimens with abnormally short or unusually long fatigue lives were fractographically examined and compared with typical failures. No obvious differences were noted among the three types of failures, although several types of defects were characterized at the initiation sites. These include (1) alumina inclusions (approx. 60 percent occurrence), (2) transition metal inclusions (approx. 30 percent occurrence), and (3) microstructural boundaries (approx. 10 percent occurrence). The fatigue strength at 10,000,000 cycles was also measured for specimens with a theoretical stress concentration factor, K(t) of three and ten. The milder notched specimens, K(t) = 3, had a 70 percent greater fatigue strength than that measured for high strength ingot alloys. The K(t) = 10 fatigue strength is the same as that measured for 7000 series ingot alloys.

GRA

N82-28417# Naval Research Lab., Washington, D. C.

ON MICROSTRUCTURAL CONTROL OF NEAR THRESHOLD FATIGUE CRACK GROWTH IN 7000 SERIES ALUMINUM ALLOYS Final Report

G. R. Yoder, L. A. Cooley, and T. W. Crooker 2 Apr. 1982 12 p refs

(RR0220148)

(AD-A113486; NRL-MR-4787) Avail: NTIS HC A02/MF A01 CSCL 11/6

Fatigue crack growth rate data for 7000 series aluminum alloys can be approximated with a multilinear form, when plotted in conventional logarithmic coordinates over a sufficiently broad spectrum of delta K. Each transition point in the growth-rate curve appears to be associated with a specific microstructural feature that can serve as a barrier to slip-band transmission, in accord with the cyclic plastic zone model of fatigue crack growth. Evidence strongly suggests that transition to the threshold for fatigue crack growth is controlled by dispersoid particles.

Author (GRA)

N82-28418# Solar Turbines International, San Diego, Calif.

EROSION MECHANISMS OF METALS Annual Report, 1 Oct. 1980 - 30 Sep. 1981

Kenneth G. Kubarych and Mary E. Gulden 30 Nov. 1981 36 p refs

(Contract F49620-78-C-0104; AF Proj. 2306)

(AD-A111537; SR81-R-4526-02; AFOSR-82-0080TR) Avail: NTIS HC A03/MF A01 CSCL 11/6

The material properties which control erosion are identified, as well as the material removal process. An erosion model was hypothesized and is based on the target stress strain response beneath the impacting particle. At low particle energies only elastic strain is generated and no damage to the target occurs. At higher energies, the peak stresses increase, leading to brittle fracture or plastic deformation accompanied by adiabatic heating. If adiabatic heating occurs, three possibilities arise. One is a temperature increase with no loss of material, and the second is that ductile fracture may occur due to inadequate ductility at whatever temperature is reached. The third is that localized regions attain the melting point prior to ductile fracture. S.L.

N82-28419# GTE Sylvania, Inc., Towanda, Pa. Chemical and Metallurgical Div.

TUNGSTEN ALLOY FABRICATION OF PENETRATOR MATERIALS Final Report, Feb. 1978 - Apr. 1980

James R. Spencer Watertown, Mass. Army Materials and Mechanics Research Center Aug. 1981 69 p refs

(Contract DAAG46-78-C-0009; DA Proj. 1T1-63102-D-071) (AD-A114187; AMMRC-TR-81-40) Avail: NTIS HC A04/MF A01 CSCL 11/6

Tungsten heavy alloy bars 1.35 inches in diameter were prepared and evaluated for uniformity of properties. Alloys contained 97.1% to 97.3% tungsten with primary emphasis on the 97.1W-1.6Ni-0.7Fe-0.5Cu-0.1Co composition. To achieve high uniform densities with this alloy, it was necessary to use fine tungsten powder (approx 1-1.5 micrometers) and slow heating rates between 1000 C and the sintering temperature. This was not necessary with similar alloys containing no copper. Tensile elongation was found to be strongly dependent on oxygen levels in the sintered bars. Low oxygen levels gave the best results with 16-17% elongation when oxygen levels were below 6 ppm. These very low oxygen levels were only achieved with alloys containing no copper. Author (GRA)

N82-28420# Pennsylvania State Univ., University Park. Dept. of Materials Science and Engineering.

USE OF METALLURGICAL VARIABLES AND SURFACE PROPERTIES TO CONTROL HYDROGEN EMBRITTLEMENT Final Technical Report

H. W. Pickering 28 Apr. 1982 18 p refs

(Contracts N00014-75-C-0264; N00014-67-A-0385-0022) (AD-A114190) Avail: NTIS HC A02/MF A01 CSCL 11/6

This final report summarizes research carried out during the course of a program directed toward evaluating the factors affecting the absorption of hydrogen by iron and steels during exposure to aqueous solutions. The effects of deposits, barrier-type layers and certain electrolyte additions were investigated. An add-on project was directed toward evaluating the mechanism of protection of Cu10Ni alloy in simulated seawater. Author (GRA)

N82-28421# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

FATIGUE PROPERTIES OF QUATOUGH STEELS Fe/4Cr/XMn/0.25C

C. Y. Kung Oct. 1981 23 p refs

(Contract W-7405-eng-48)

(DE82-005140; LBL-13465) Avail: NTIS HC A02/MF A01

The fatigue crack propagation results of the quatough steels in comparison to those of the commercial high strength steels 4340 and 300M at heat treatment conditions (i.e., as quenched +2000C tempering) are reported. DOE

N82-28422# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

FATIGUE CRACK PROPAGATION THRESHOLDS FOR LONG AND SHORT CRACKS IN RENE 95 NICKEL-BASE SUPERALLOY

J. F. McCarver (Schlumberger Well Services) and R. O. Ritchie Oct. 1981 18 p refs

(Contract W-7405-eng-48)

(DE82-005135; LBL-13453) Avail: NTIS HC A02/MF A01

The near-threshold fatigue crack propagation behavior of a wrought Ni-base superalloy, Rene 95 was studied with reference to the effect of crack size on the threshold stress intensity for no detectable crack growth. Measured threshold values at low load ratios (R = 0.1) for physically short cracks (0.1 to 0.20 mm) were found to be 60% smaller than the corresponding values for long cracks (approx. 25 mm). However, short crack threshold values at R = 0.1 were found to be similar to long crack thresholds at R = 0.8. Such behavior is rationalized in terms of fatigue crack closure, specifically involving the role of fracture surface roughness from crystallographic crack growth in Ni-base alloys. The large difference observed in threshold values for long and physically-short cracks serves to illustrate the potential problems in applying conventional (long crack) fatigue data to defect-tolerant lifetime predictions for structural components containing small flaws. DOE

N82-28423# Massachusetts Inst. of Tech., Cambridge. Materials and Molecular Research Div.

INFLUENCES OF GASEOUS ENVIRONMENT ON LOW GROWTH-RATE FATIGUE CRACK PROPAGATION IN STEELS Final Report, 1 May 1979 - 31 Aug. 1981

Robert O. Ritchie, S. Suresh, and J. Toplosky Sep. 1981 94 p refs Prepared in Cooperation with California Univ., Berkeley. Lawrence Berkeley Lab.

(Contracts DE-AS02-79ER-10389; W-7405-eng-48) (DE82-005134; LBL-13421; DOE/ER-10389/2) Avail: NTIS HC A05/MF A01

It is demonstrated that contrary to conventional wisdom, there are two regions of fatigue crack growth where hydrogen gas causes significant accelerations in crack propagation rates compared to air. Enviromental influences in these two regimes are shown to be dominated by entirely different mechanisms. DOE

N82-28424# Ames Lab., Iowa.

THERMOTRANSPORT OF HYDROGEN AND DEUTERIUM IN VANADIUM, NIOBIUM AND TANTALUM ALLOYS Ph.D. Thesis

Mark Francis Smith Oct. 1981 80 p refs

(Contract W-7405-eng-82)

(DE82-005453; IS-T-939) Avail: NTIS HC A05/MF A01

Heats of transport was determined for thermotransport of hydrogen and deuterium in pure vanadium, niobium and tantalum; in vanadium alloyed with either niobium, titanium or chromium; and in niobium tantalum alloys. In all cases, thermotransport was toward colder regions and was significantly greater for deuterium than for hydrogen. A mass spectrometric technique was used to simultaneously measure heats of transport for hydrogen and deuterium in a single specimen containing both isotopes. This technique greatly increased the precision with which isotope effects in the heat of transport could be measured. The predominant effect of alloying was to dramatically increase thermotransport; however, thermotransport decreased as niobium was added to tantalum. DOE

N82-28425# Ames Lab., Iowa.

MECHANISTIC CHEMISTRY OF SOME TRANSITION METAL COMPLEXES Ph.D. Thesis

Garry Wayne Kirker Oct. 1981 196 p refs

(Contract W-7405-eng-82)

(DE82-005577; IS-T-954) Avail: NTIS HC A09/MF A01

The reactivity of several pentaaquo: alpha-hydroxyalkyl chromium(III) complexes including (H2O)5CrCH(C2H5)OH(2+), CrC(CH3) (C2H5)OH(2+), CrC(C2H5)2OH(2+), CrC(CH3) (i-C3H7)OH(2+) and CrC(C3) (t-C4H9)OH(2+) was examined. The chromium carbon bond was cleaved by both heterolytic and homolytic pathways. The reactions of five alkylchromium(III) complexes with Cu(2+) or Fe(3+) were investigated. The predominant pathway for reactions with both oxidants was inversely dependent on the acid concentration in the range studied. Three dicobalt(II) complexes of Schiff base macrocyclic ligands with N2O2 chelating sites were prepared. These complexes were all based upon the tetra(salicylidene amino)benzene unit. The complexes were characterized by their electronic spectra and elemental analysis. The dicobalt(II) complexes are easily oxidized to the dicobalt(III) analogs. The dicobalt(III) complexes may be re-reduced to the parent dicobalt(II) complexes with CrCl2. One organometallic derivative was prepared. It was characterized by its reaction with Hg(II) and its photodecomposition to the

dicobalt(II) complex under anaerobic conditions and to dicobalt(III) under aerobic conditions. DOE

N82-28426# Princeton Univ., N. J. Plasma Physics Lab.
SECONDARY ELECTRON YIELDS OF CARBON-COATED AND POLISHED STAINLESS STEEL
D. Ruzic, R. Moore, D. Manos, and S. Cohen Feb. 1982 28 p refs Supported in part by the Fannie and John Hertz Foundation
(Contract DE-AC02-76CH-03073)
(DE82-012762; PPPL-1874) Avail: NTIS HC A03/MF A01

To increase the power throughput to a plasma of an existing lower hybrid waveguide, secondary electron production on the walls and subsequent electron multiplication must be reduced. Since carbon has a low secondary electron coefficient (delta), measurements were performed for several UHV compatible carbon coatings (Aquadag, vacuum pyrolized Glyptal, and lamp black deposited by electrophoresis) as a function of primary beam voltage, surface roughness, coating thickness, and angle of incidence (theta). Also measured were uncoated stainless steel, Mo, Cu, Ti, TiC, C as soot, and ATJ graphite. The yields were obtained by varying the sample bias and measuring the collected current while the samples were in the electron beam of a scanning Auger microprobe. Results show delta to have a typical energy dependence, with a peak occurring at 200 to 300 eV for normal incidence, and at higher energy for larger theta. In general, delta increases with theta more for smooth surfaces than for rough ones. 90% of the secondary electrons have energies less than 25 eV. Some carbonized coating and surface treatment combinations give delta sub max = 0.88 + or - 0.01 for normal electron beam incidence. This is a reduction of almost 40% compared to untreated stainless steel. J.D.

N82-28427# National Coal Board, Leatherhead (England).
IN-BED CORROSION TESTS OF SUPERHEATER ALLOYS IN A 10-SQUARE-FOOT AFBC Final Report
A. G. Roberts, R. V. Wardell, and A. J. Minchener Nov. 1981 262 p Sponsored by Electric Power Research Inst.
(EPRI Proj. 979-2)
(DE82-901346; EPRI-CS-2118) Avail: NTIS HC A12/MF A01

Candidate superheater alloys in the form of tubes and hanger materials were immersed for 1000 to 2000 h in the fluidized bed of a small industrial boiler in which operating conditions were representative of conditions which might be expected in a future commercial power plant. Materials investigated included low medium and high chromium ferritic steels, iron based austenitic steels, and nickel based alloys. The results (1) indicate that some iron based austenitic steels and high chromium ferritic steels are likely to be suitable for superheater tubes whilst nickel based alloys are not; (2) suggest that some iron based austenitic steels are suitable materials for uncooled hanger components while fecralloy type steels may be suitable for both cooled and uncooled applications; and (3) were not significantly different from those obtained on small rigs over similar periods of operation at similar temperatures. DOE

N82-28428# Oak Ridge National Lab., Tenn. Chemical Technology Div.
EVALUATION OF POTENTIAL PROCESSES FOR RECOVERY OF METALS FROM COAL ASH. VOLUME 2: LABORATORY DATA AND COST ESTIMATES Final Report
R. M. Canon, T. M. Gilliam, and J. S. Watson Nov. 1981 222 p refs
(Contract W-7405-eng-26; EPRI Proj. 1404-2)
(DE82-005592; EPRI-CS-1992-Vol-2) Avail: NTIS HC A10/MF A01

An experimental campaign was carried out to develop process flowsheets for the removal of metals from fly ash and their subsequent separation into saleable products. The capital cost requirements for processing 1 million tons of ash (dry basis) per year were $42.5 million and $55 million, respectively, for the two most promising processes, HCl direct acid leach and pressure digestion acid leach. The net yearly cash flow for the HCl direct acid leach process was $15.2 million, which makes it a viable option. The pressure digestion acid leach process, on the other hand, had a negative cash flow of $22 million, which makes it unattractive. DOE

N82-28429# Electric Power Research Inst., Palo Alto, Calif. Nuclear Power Div.
STRESS CORROSION CRACKING OF ALLOY 600
Eduardo Serra (Centro de Pesquisas de Energia Eletrica-Cepel, Rio de Janeiro) Nov. 1981 57 p refs
(DE82-901313; EPRI-NP-2114-SR) Avail: NTIS HC A04/MF A01

The stress corrosion cracking of Alloy 600 tubing in pressurized water reactor steam generators is addressed. A general model that can explain the stress corrosion cracking behavior of Alloy 600 in deaerated or aerated high-temperature pure water or in the environments that might exist in the primary and secondary coolant of a steam generator is sought. Such a model must cover the complex interaction of the environmental, metallurgical, and mechanical variables which control the susceptibility of Alloy 600 to stress corrosion cracking. Each of these classes of variables is discussed. DOE

N82-28430# Bendix Corp., Kansas City, Mo. Dept. of Metrology Engineering.
MOLYBDENUM AND ITS ANALYSES
George M. Hale Jan. 1982 63 p refs
(Contract DE-AC04-76DP-00613)
(DE82-007645; BDX-613-2730) Avail: NTIS HC A04/MF A01

The physical and chemical properties of molybdenum are examined, and numerous analytical methods are considered in search of an optimum qualitative test for detecting Mo or its principal alloy TZM in concentrations as low as 0.1 (SIGMA)g in 10 ml of solvent, a dilution of 1:100,000,000. A zinc xanthate chemical spot test is recommended as an inexpensive, convenient, and sensitive test, with a detection limit of 0.01 (SIGMA)g Mo per drop of acid test solution. DOE

N82-28431# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
GALVANICALLY PRECIPITATED ALUMINUM: A NEW MATERIAL [GALVANISCH ABGESCHIEDENES ALUMIMIUM EIN NEUER WERKSTOFF]
Richard Suchentrunk and Hermann Tippmann 1982 10 p refs Repr. from Galvanotech., v. 1, no. 73 (Saulgau/Wuert, West Germany), 1981 p 2-8 In GERMAN
(MBB-515-82-O) Avail: Issuing Activity

A system for galvanic precipitation of aluminum, using an aluminum alkyl sodium fluoride electrolyte, was developed. The deposition technology, the characteristics of galvanic aluminum plating, and application examples are described and discussed. Anticorrosion coating of high strength steel, aluminizing light metals (titanium, aluminum, magnesium, and their alloys) and coating fiber reinforced composite materials, such as aluminum boron composites, are treated. For environmental reasons, galvanic aluminum offers an attractive alternative to highly toxic plating materials, e.g., cadmium. Author (ESA)

N82-28432# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
INVESTIGATION OF CORROSION AND MICROSTRUCTURAL PROPERTIES OF HIGH STRENGTH ALUMINUM ALLOYS AFTER JOMINY TESTING
W. G. J. tHart, H. J. Kolkmann, and L. Schra Feb. 1981 13 p ref Presented at 7th Intern. Light Metal Congr., Vienna, Jun. 1981
(NLR-MP-81004-U) Avail: NTIS HC A02/MF A01

The relation between quench rate, corrosion properties, and microstructure of commercial aluminum alloys 2024 and 7075, whose midsections cannot be quenched as rapidly as the surface, was investigated. The Jominy end quench test was applied to extruded rods. Stress corrosion resistance along the bars was determined by alternately immersing specimens in aqueous NaCl and exposing them to the open air, and recording time to visible cracking. Microstructure was examined by electron microscopy of 0.2 mm thick slices cut from the quench plane and 100 mm from it. The presence of coherent matrix precipitates results in inferior stress corrosion properties. The less inhomogeneous the microstructure, the greater the resistance to exfoliation.
Author (ESA)

N82-28433# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.

THE INFLUENCE OF DIFFERENT TYPES OF ANODIC LAYERS ON THE FATIGUE PROPERTIES OF 2024-T3 AND 7075-T6 SHEET MATERIAL

W. G. J. tHart and A. Nederveen Jul. 1980 35 p refs

(Contract NIVR-1725)

(NLR-TR-80077-U) Avail: NTIS HC A03/MF A01

Constant amplitude and flight simulation fatigue tests were performed on sulfuric acid, chromic acid and phosphoric acid anodized specimens. Fatigue behavior was compared with that of bare sheets. It is shown that sulfuric acid and sealed chromic acid anodic layers have low fracture strains compared to those of unsealed chromic acid and phosphoric acid anodic layers. Constant amplitude fatigue tests on anodized unnotched specimens reveal that sulfuric acid and sealed chromic acid anodic layers cause the largest decrease in fatigue strength. Phosphoric and unsealed chromic acid anodic layers do not significantly affect fatigue life. Scanning electron microscopy of fracture surfaces confirms that fatigue cracks initiate at cracks in the anodic layers. Author (ESA)

N82-28434# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Dept.

THE JOMINY END-QUENCH TEST FOR INVESTIGATION OF CORROSION PROPERTIES AND MICROSTRUCTURE OF HIGH STRENGTH ALUMINUM ALLOYS

W. G. J. tHart, H. J. Kolkman, and L. Schra Nov. 1980 49 p refs

(Contract NIVR-1869)

(NLR-TR-80102-U) Avail: NTIS HC A03/MF A01

The Jominy test was applied to extruded rods of aluminum alloys 2024 and 7075 in order to obtain a decreasing quench rate over the length of the rods. The alloys were heat treated to the conditions 2024-T4, 2024-T6, and 7075-T73. The relation between quench rate, corrosion properties, and microstructure is discussed. Stress corrosion crack (SCC) initiation tests reveal that 7075-T73 is completely immune to SCC; 7075-T6 is sensitive to SCC for a cooling rate higher than 15 K/sec and 2024-T4 and 2024-T6 has low stress corrosion resistance for all cooling rates. The high stress corrosion resistance mentioned in the literature for fast quenched 2024 alloys is not confirmed. Exfoliation corrosion tests show that fast quenched parts of the 2024-T4, and 7075-T6 and 7075-T73 rods are reasonably resistant to intergranular corrosion. Stress corrosion resistance is improved by producing incoherent precipitates. Author (ESA)

N82-28435# Bureau of Mines, Avondale, Md. Research Center.

A PYROMETALLURGICAL METHOD FOR PROCESSING Ni-Cd SCRAP BATTERIES

Donald A. Wilson and Harry V. Makar Nov. 1981 20 p refs

(PB82-145426; BM-RI-8574; LC-81-10151) Avail: NTIS HC A02/MF A01 CSCL 11E

As part of a continuing effort to maximize metal recovery from domestic secondary resources, the Bureau of Mines investigated a process for recovering the metallic portion of scrap alkaline batteries. A pyrometallurgical method for recovering nickel and cadmium from NiCd scrap batteries previously developed on a laboratory scale, was scaled up to 25- and 43-pound charges. The method employed reduction and/or decomposition in a retort using a minimum of 2.5 percent carbon as a reductant. Metallic cadmium was distilled at atmospheric pressure and a minimum of 900C. Purity of the recovered cadmium was 99.8 percent minimum and the nickel-iron residue contained less than 0.02 percent cadmium. GRA

N82-28436# International Nickel Co., Inc., Suffern, N. Y. Research and Development Center.

PROCESS FOR RECOVERING CHROMIUM AND OTHER METALS FROM SUPERALLOY SCRAP

John J. deBarbadillo, J. K. Pargeter, and H. V. Makar (Bureau of Mines, Avondale, Md.) Nov. 1982 82 p

(Contract DI-BM-JO-188056)

(PB82-145418; BM-RI-8570; LC-81-6102) Avail: NTIS HC A05/MF A01 CSCL 11F

A process for recovering chromium and other metals from superalloy scrap is described. Laboratory scale experiments were conducted to test a complex flowsheet utilizing a wide range of extractive metallurgical operations. The novel basis for the process is the formation of a sulfide matte in which chromium is concentrated in a discrete chromium sulfide phase. Mineral processing and hydrometallurgical procedures are used to separate chromium sulfide from the other matte constituents. The products of the process are a chromium-nickel alloy suitable for reuse in the superalloy industry, electrolytic nickel, electrolytic cobalt, and iron-molybdenum residue. Recovery of the principal elements contained in the scrap is chromium 93 percent, nickel 99 percent, cobalt 96 percent, and molybdenum 92 percent. GRA

N82-28437# Bureau of Mines, Rolla, Mo. Research Center.

ELECTROLYTIC METHOD FOR RECOVERY OF LEAD FROM SCRAP BATTERIES

Ernest R. Cole, Jr., A. Y. Lee, and Danton L. Paulson Nov. 1981 25 p refs

(PB82-141045; BM-RI-8602; LC-81-607109) Avail: NTIS HC A02/MF A01 CSCL 11F

Bench scale research resulting in the development of a combination electrorefining-electrowinning method for recycling all the lead in scrap batteries is described. The method reduces energy consumption and eliminates toxic emissions, in contrast to present pyrometallurgical smelting, and the lead produced is pure enough for use in maintenance-free batteries. GRA

N82-28438# Bureau of Mines, Washington, D. C.

COBALT AVAILABILITY-DOMESTIC: A MINERALS AVAILABILITY SYSTEM APPRAISAL Information Circular

Gary R. Peterson, Donald L. Zleiwas, and Paul R. Thomas Oct. 1981 39 p refs

(PB82-135435; BM-IC-8848) Avail: NTIS HC A03/MF A01 CSCL 11F

The potential supply of cobalt from known domestic resources was evaluated both as a primary product from some deposits and as a byproduct from others. The U.S. production can play an important role in meeting U.S. cobalt needs. This production would be of a relatively short duration, however, with production declining significantly before the year 2000. A tonnage-price relationship was developed indicating the quantity of cobalt that could be produced from known cobalt bearing deposits at various primary commodity prices and at a 15 percent rate of return on the required capital investment. All capital and operating costs are calculated in August 1980 dollars, and commodity prices are based on August 1980 prices. GRA

N82-28439# Bureau of Mines, Reno, Nev. Research Center.

MAGNETIC PROPERTIES OF ALLOYS CONTAINING MISCHMETAL, COBALT, COPPER, IRON, AND MAGNESIUM

John W. Walkiewicz, John S. Winston, and Morton M. Wong Dec. 1981 29 p refs

(PB82-158940; BM-RI-8583; LC-81-607845) Avail: NTIS HC A03/MF A01 CSCL 11F

Alloys containing mischmetal (MM), cobalt, copper, magnesium, and iron were investigated for use in permanent magnets in place of the scarce samarium-cobalt alloys. The magnetic properties of MM-Co, MM-Co-Cu, MM-Co-Cu-Mg, and MM-Co-Cu-Fe-Mg alloys were evaluated. Magnets were fabricated by powder metallurgy consisting of arc-melting the metals, crushing and grinding the resultant alloys, aligning and compacting the powder, and sintering the compacts. GRA

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N82-28440* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TEXTURING POLYMER SURFACES BY TRANSFER CASTING Patent

Bruce A. Banks, Albert J. Weigand, and James S. Sovey, inventors (to NASA) Issued 11 May 1982 4 p Filed 19 Dec. 1980

Supersedes N81-16327 (19 - 07, p 899)
(NASA-Case-LEW-13120-1; US-Patent-4,329,385;
US-Patent-Appl-SN-218587; US-Patent-Class-428-141;
US-Patent-Class-204-192E; US-Patent-Class-204-192EC;
US-Patent-Class-264-22; US-Patent-Class-264-220) Avail: US Patent and Trademark Office CSCL 11G

A technique for fabricating textured surfaces on polymers without altering their surface chemistries is described. A surface of a fluorocarbon polymer is exposed to a beam of ions to texture it. The polymer which is to be surface-roughened is then cast over the textured surface of the fluorocarbon polymer. After curing, the cast polymer is peeled off the textured fluorocarbon polymer, and the peeled off surface has negative replica of the textured surface. The microscopic surface texture provides large surface areas for adhesive bonding. In cardiovascular prosthesis applications the surfaces are relied on for the development of a thin adherent well nourished thrombus.

Official Gazette of the U.S. Patent and Trademark Office

N82-28441* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

METHOD OF PROTECTING A SURFACE WITH A SILICON-SLURRY/ALUMINIDE COATING Patent

Daniel L. Deadmore and Stanley G. Young, inventors (to NASA) Issued 12 Jan. 1982 6 p Filed 20 Jun. 1980 Supersedes N80-26389 (18 - 17, p 2237)
(NASA-Case-LEW-13343-1; US-Patent-4,310,574;
US-Patent-Appl-SN-161254; US-Patent-Class-427-405;
US-Patent-Class-427-205; US-Patent-Class-427-253;
US-Patent-Class-428-938; US-Patent-Class-428-941) Avail: US Patent and Trademark Office CSCL 11G

A low cost coating for protecting metallic base system substrates from high temperatures, high gas velocity oxidation, thermal fatigue and hot corrosion is described. The coating is particularly useful for protecting vanes and blades in aircraft and land based gas turbine engines. A lacquer slurry comprising cellulose nitrate containing high purity silicon powder is sprayed onto the superalloy substrates. The silicon layer is then aluminized to complete the coating. The Si-'' coating is less costly to produce than advanced aluminides and protects the substrate from oxidation and thermal fatigue for a much longer period of time than the conventional aluminide coatings. While more expensive Pt-Al coatings and physical vapor deposited MCrAlY coatings may last longer or provide equal protection on certain substrates, the Si-Al coating exceeded the performance of both types of coatings on certain superalloys in high gas velocity oxidation and thermal fatigue. Also, the Si-Al coating increased the resistance of certain superalloys to hot corrosion.

Official Gazette of the U.S. Patent and Trademark Office

N82-28442* National Aeronautics and Space Administration. Pasadena Office, Calif.

METHOD OF FORMING FROZEN SPHERES IN A FORCE-FREE DROP TOWER Patent

James M. Kendall Jr., inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 2 Feb. 1982 4 p Filed 24 Dec. 1980 Supersedes N81-16328 (19 - 07, p 0899) Sponsored by NASA
(NASA-Case-NPO-14845-1; US-Patent-4,313,745;
US-Patent-Appl-SN-219680; US-Patent-Class-65-21.4;
US-Patent-Class-65-22; US-Patent-Class-65-142;
US-Patent-Class-264-5; US-Patent-Class-425-6) Avail: US Patent and Trademark Office CSCL 11B

Hollow glass spheres are shaped by the effects of surface tension acting on bubbles of glass in its molten state. A downwardly flowing stream of air accelerated at a one-G rate of acceleration is established through a drop bubbles on molten glass are introduced into the stream of air and frozen and as they are accelerated at a one-G rate of acceleration.

Official Gazette of the U.S. Patent and Trademark Office

N82-28443# Tampere Univ. Technology (Finland). Inst. of Materials Science.

STUDIES OF THE DYNAMIC AND MECHANICAL PROPERTIES OF THERMOPLASTICS BY THE SPLIT HOPKINSON PRESSURE BAR METHOD

E. J. Paeaekkoenen, V. T. Kuokkala, and P. Toermaelae 1981 26 p refs
(PH-130; ISBN-951-668-135-1; ISBN-0355-721) Avail: NTIS HC A03/MF A01

The split Hopkinson pressure bar method is introduced in the investigation of thermoplastics. Compression tests at strain rates of the order of 1000 s(-1) were performed on polypropylene, polyamide 6 and polycarbonate. The materials were studied in both elastic and plastic deformations over a temperature range of -110 (163 K) to +160 C (433 K). The stress-strain curves were determined from the computed measurement data. The yield strength for all materials was approximately 300 N sq mm and the elastic modulus was about 20,000 N sq mm at room temperature. Curves of three types were obtained in the plastic experiments and the differences were explained by means of relaxation theory. The damping factor was determined for all materials from the measurement results. The loss modulus of polycarbonate was calculated from the temperature rise in the specimens. In addition the influence of annealing on the properties of polycarbonate was studied using split Hopkinson pressure bar tests. S.L.

N82-28444*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

METHOD FOR THE PREPARATION OF THIN-SKINNED ASYMMETRIC REVERSE OSMOSIS MEMBRANES AND PRODUCTS THEREOF Patent Application

Theodore J. Wydeven and Moshe G. Katz, inventors (to NASA) Filed 25 Jun. 1982 14 p
(NASA-Case-ARC-11359-1; US-Patent-Appl-SN-392092) Avail: NTIS HC A02/MF A01 CSCL 07C

A method for preparing water insoluble asymmetric membranes from water soluble polymers is discussed. The process involves casting a film of the polymer, momentarily partially drying it and then contacting it with a concentrated solution of a transition metal salt. The transition metal ions insolubilize the polymer and are believed to form a complex with it. Optionally, thereafter, the polymer is crosslinked with heat or radiation. The most preferred polymer is poly(vinyl alcohol). The most preferred complexing salt is copper sulfate. The process and the metal-ion linked membranes are discussed. The membranes are reverse osmosis membranes. NASA

N82-28445*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ION BEAM SPUTTER DEPOSITED DIAMOND LIKE FILMS

Bruce A. Banks and Sharon K. Rutledge 1982 18 p refs Presented at Meeting of the Greater New York Chapter of the Am. Vacuum Soc., Yorktown Heights, N.Y., 2 Jun. 1982
(NASA-TM-82873; E-1249; NAS 1.15:82873) Avail: NTIS HC A02/MF A01 CSCL 11G

A single argon ion beam source was used to sputter deposit carbon films on fused silica, copper, and tantalum substrates under conditions of sputter deposition alone and sputter deposition combined with simultaneous argon ion bombardment. Simultaneously deposited and ion bombarded carbon films were prepared under conditions of carbon atom removal to arival ratios of 0, 0.036, and 0.71. Deposition and etch rates were measured for films on fused silica substrates. Resulting characteristics of the deposited films are: electrical resistivity of densities of 2.1 gm/cu cm for sputter deposited films and 2.2 gm/cu cm for simultaneously sputter deposited and Ar ion bombarded films. For films approximately 1700 A thick deposited by either process and at 5550 A wavelength light the reflectance was 0.2, the absorptance was 0.7, the absorption coefficient was 67,000 cm to the -1 and the transmittance was 0.1. Author

N82-28446# Thiokol Corp., Brigham City, Utah.

POLYCYCLIC HIGH ENERGY OXIDIZERS Annual Summary Report, 1 Mar. 1981 - 28 Feb. 1982

J. C. Hinshaw Mar. 1982 22 p refs
(Contract N00014-81-C-0204)
(AD-A112585) Avail: NTIS HC A02/MF A01 CSCL 11/9

Efforts toward the synthesis of polycyclic high density, high energy oxidizers have involved examination of synthetic paths to the hexaazaadamantane framework. Routes examined include condensation of amides with an orthoformate, reaction of tris(acylamino) methanes with orthoformate and cyclizations based on acylated perhydrotriazines. The cyclization chemistry of a pentaazabicyclononadiene is also under investigation. Several

routes to tetranitrazabicyclooctane ('bicyclic HMX') have also been examined including modification of the preformed tetraazabicyclo-octane ring system and cyclization approaches. Author (GRA)

N82-28447# Army Materials and Mechanics Research Center, Watertown, Mass. Mechanics of Materials Div.
REQUIREMENTS FOR FLEXURE TESTING OF BRITTLE MATERIALS Final Report
Francis I. Baratta Apr. 1982 53 p refs
(AD-A113937; AMMRC-TR-82-20) Avail: NTIS HC A04/MF A01 CSCL 11/2

Requirements for accurate bend-testing of four-point and three-point beams of rectangular cross-section are outlined. The so-called simple beam theory assumptions are examined to yield beam geometry ratios that will result in minimum error when utilizing elasticity theory. Factors that give rise to additional errors when determining bend strength are examined, such as; wedging stress, contact stress, load mislocation, beam twisting, friction at beam contact points, contact point tangency shift, and neglect of corner radii or chamfer in the stress determination. Also included are the appropriate Weibull strength relationships and an estimate of errors in the determination of the Weibull parameters based on sample size. Error tables, based on many of the previously mentioned factors, are presented. Such data are utilized to rationally arrive at a 1/3-four-point and a three-point beam of a specific geometry ratio and dimension that will result in minimization of errors during flexure testing. Although such beams are recommended for a military standard, they are termed reference standard beams. Beams of other loading configurations and dimensions are considered acceptable if statistical correlation to one of the reference standards is determined, and if error spans are reported when presenting flexure test data. Author (GRA)

N82-28448# Electrochemical Technology Corp., Seattle, Wash.
DETERMINATION OF THE EFFECT OF COMPOSITION, STRUCTURE AND ELECTROCHEMICAL MASS TRANSPORT PROPERTIES ON ADHESION AND CORROSION INHIBITION OF PAINT FILMS Final Report, 1 Nov. 1980 - 31 Oct. 1981
Robert T. Ruggeri and Theodore R. Beck Oct. 1981 118 p refs
(Contract N00014-79-C-0021)
(AD-A113975) Avail: NTIS HC A06/MF A01 CSCL 11/3

Since 1979, nine paints meeting military specifications have been studied. Seven of these paints have been formulated with well known chemical compositions. A sequence of tests including dynamic mechanical, IR and UV spectroscopy, and small angle x-ray scattering was performed to determine the physical and chemical structure of the paints. At the same time, new apparatus and techniques were developed to measure the transport of ions and water through paint films. In the past year, Hittorf experiments have been conducted to measure the migration of sodium chloride and water through paints. Improved humidity chamber apparatus and techniques have been developed to measure the diffusivity and solubility of water in paints attached to metal substrates. Five new mathematical models, developed to interpret the results of these experiments, have been used to deduce the physical form of coatings applied to metals. Preliminary experiments have been conducted to measure the hydraulic permeability of electrolytes through paints. These experiments were performed to obtain coefficients needed for the corrosion model. Also, experiments have been initiated to determine which components of paints have the greatest influence on water diffusivity. GRA

N82-28449# Purdue Univ., Lafayette, Ind.
SUPER HYDRIDES Final Report, 1 Feb. 1979 - 31 Jan. 1982
Herbert C. Brown 18 Mar. 1982 23 p
(Contract DAAG29-79-C-0027)
(AD-A113229; ARO-16184.18-C) Avail: NTIS HC A02/MF A01 CSCL 07/2

The unusual reactivity of lithium triethylborohydride (Super Hydride) encouraged us to examine the selective reduction properties of a number of new reducing agents. Lithium trialkylborohydrides (LiR3BH) reduce most of the organic functional groups rapidly. On the other hand, lithium borohydride (LiBH4) is a mild reducing agent. In order to develop new reagents dialkylborohydrides (MR2BH2) and alkylborohydrides (MRBH3) were prepared successfully. Although the full potentialities of these reagents are yet to be explored, preliminary studies have shown very encouraging results. We have developed new improved methods for the reduction of esters, nitriles, and amides with the convenient and readily available reagent, borane-dimethyle sulfide (BH3.SMe2, BMS). These developments have simplified the reduction of such functional groups. Lithium borohydride, a relatively expensive, but useful, reducing agent, has been prepared from sodium borohydride. This method is generally applicable for the preparation of various borohydrides. GRA

N82-28450# Naples Univ. (Italy). Dept. of Chemical Engineering.
EFFECT OF APPLIED STRESS, THERMAL ENVIRONMENT AND WATER IN EPOXY RESINS Final Scientific Report, 1 Jun. 1977 - 30 Nov. 1980
L. Nicolais, A. Apicella, and E. Drioli Dec. 1980 52 p refs
(Grant AF-AFOSR-3369-77; AF Proj. 2307)
(AD-A113016; AFOSR-82-0215TR) Avail: NTIS HC A04/MF A01 CSCL 11/9

A series of absorption experiments on Epikote 828 resin have been conducted to provide a qualitative understanding of the mechanisms associated with moisture uptake by composite matrix materials, and to assess the effects of the hygrothermal and stress environments. Absorption kinetics and apparent equilibrium moisture concentrations have been determined by immersing samples in constant temperature baths, and periodically removing them for weighing on a quartz helical spring microbalance, until no change in weight could be detected. Two sample types differing in the length of postcuring (3 and 6 days respectively) have been tested to determine the effect of curing on moisture absorption. GRA

N82-28451# Wisconsin Univ., Madison. Dept. of Chemistry.
CHEMICAL REACTIONS AND PROPERTIES OF ORGANO-SILICON COMPOUNDS RELATED TO NEW MATERIALS Final Report, 1 Feb. 1978 - 31 Jan. 1982
Robert West 6 Apr. 1982 13 p refs
(Grant AF-AFOSR-3570-78; AF Proj. 2303)
(AD-A114377; AFOSR-82-0339TR) Avail: NTIS HC A02/MF A01 CSCL 07/3

A summary of research leading to (1) The discovery and characterization of formable polysilane high polymers, copolymers of phenylmethylsilane and dimethylsilanes units; (2) Investigations leading to the synthesis of tetramesityldisilene, the first compound containing a silicon-silicon double bond; and (3) Various advances in the chemistry of polysilanes. GRA

N82-28452# Akron Univ., Ohio. Inst. of Polymer Science.
THRESHOLD TEAR STRENGTH OF ELASTOMERS
Alan N. Gent and R. H. Tobias Apr. 1982 21 p refs Submitted for polymer publication Sponsored in part by Lord Corp.
(Contract N00014-76-C-0408; NR Proj. 092-555)
(AD-A114239; TR-15) Avail: NTIS HC A02/MF A01 CSCL 11/9

Tear strengths have been measured for a wide variety of molecular networks under threshold conditions; i.e., at high temperatures, low rates of tearing, and with swollen samples. For all of the polymers examined, the threshold tear strength was found to be proportional to the square root of the average molecular weight M sub c of network strands, in agreement with theory. However, for the same M sub c and hence for similar values of elastic modulus, different polymers showed major differences in threshold tear strength. The tear strength of polydimethylsiloxane networks was only about one third as large as that for networks of polybutadiene and cis-polyisoprene and the values obtained for polyphosphazene networks were only about one fifth as large as the same M sub C. These striking differences are attributed to differences in network strand length and extensibility for the same molecular weight. The threshold tear strengths are shown to be in satisfactory quantitative agreement with theoretically predicted values on this basis. Author (GRA)

N82-28453# Akron Univ., Ohio. Inst. of Polymer Science.
AND THE VELOCITY OF FREE RETRACTION FOR NATURAL RUBBER
A. N. Gent and P. Marteny May 1982 28 p refs Submitted for Publication Sponsored in part by Lord Corp.
(Contract N00014-76-C-0408; NR Proj. 092-255)
(AD-A114238; TR-16) Avail: NTIS HC A03/MF A01 CSCL 11/10

Measurements have been made of the velocity of sound and the velocity of free retraction for stretched strips of vulcanized natural rubber. Both of these velocities are found to increase markedly with increasing strain, in agreement with earlier work. The velocity of sound is shown to be related to the appropriate modulus of elasticity, defined by the slope of the curve relating true stress to tensile strain. Values obtained range from about 50 to about 800 m/s. The effects of prior stretching and of stress relaxation on the velocity of sound are shown to arise from corresponding changes in the modulus of elasticity at a given strain. The velocity of free retraction is shown to be directly related to the velocity of sound in the stretched strip, and to the imposed tensile strain, increasing from zero up to about 100 m/s at high strains. Author (GRA)

N82-28454# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Macromolecular Science.
CHEMICAL DESIGN OF ELASTOMERIC BEHAVIOR Final Report, 15 Jan. 1980 - 14 Jan. 1982
Jack L. Koenig 20 Apr. 1982 16 p refs
(Contract DAAG29-80-C-0059)
(AD-A114335; DRXRO-IP-L-16728-C; ARO-16728.5-CH) Avail: NTIS HC A02/MF A01 CSCL 11/10

High resolution magic-angle proton enhanced NMR spectra have been obtained of peroxide crosslinked polybutadiene and sulfur-vulcanized natural rubber. These spectra allow a determination of the crosslink structure in these elastomers. Chemical modification of the structure of the crosslinks have been made. GRA

N82-28455# Houston Univ., Tex.
ENDOR STUDIES OF RADIATION-PRODUCED TRAPPED ELECTRONS AND RADICALS IN DISORDERED SYSTEMS AND RADICAL MATRIX INTERACTIONS IN POLYMERS AND ON SURFACES Final Report, 1 Nov. 1975 - 18 Feb. 1982
Larry Kevan 30 Apr. 1982 22 p
(Grants DAAG29-76-G-0109; DAAG29-79-G-0033; DAAG29-80-K-0071)
(AD-A114321; ARO-13356.10-CH-X; ARO-16127.6-CH) Avail: NTIS HC A02/MF A01 CSCL 07/4

ENDOR has been applied to radiation-produced trapped electrons and radicals in glassy and polymeric matrices. The temperature dependence of peroxy radical spectra has been analyzed in terms of specific motional mechanisms. Abstracts of 20 publications and titles of 40 scientific talks on these topics are given. The emphasis has been to develop new methods for the application of ENDOR to disordered systems and for the analysis of peroxy radical spectra vs temperature. Author (GRA)

N82-28456# Harvey Mudd Coll., Claremont, Calif. Engineering Clinic.
USE OF METALLIC GLASSES IN MAGNETIC SWITCHING Final Report
Jul. 1981 100 p Prepared for California Univ., Livermore. Lawrence Livermore Lab.
(Contract W-7405-eng-48)
(DE82-006736; UCRL-15386) Avail: NTIS HC A05/MF A01

The feasibility of using toroidal, ribbon wound metallic glass cores in high frequency magnetic switching applications is discussed. A high frequency test circuit was constructed to examine the switching characteristics of two different metallic glass test cores (Metglas 2605CO and Metglas 2605SC). Also, two different mathematical models that simulate the magnetic flux induced in a magnetic core in response to an applied current were compared and implemented in computer simulations of the high frequency test circuit. At high frequency, experimental data have shown that the coercive forces of the metallic glass cores increased well above the manufacturer's low frequency specifications, indicating that the cores would function poorly as magnetic switches at high frequencies. DOE

N82-28457# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
STATE OF THE ART AND DEVELOPMENT OF NONMETALLIC MATERIALS: GLASS, CERAMIC, GRAPHITE [STAND UND ENTWICKLUNGEN BEI NICHTMETALLISCHEN WERKSTOFFEN: GLAS - KERAMIK - GRAPHIC]
Rolf Meistring 29 Jan. 1982 31 p refs In GERMAN Presented at Wehrtech. Symp. Entwicklung der Werkstoff- u. Fertigungsteck. in den naechsten 20 Jahren, Mannheim, West Germany 17 Dec. 1981 Sponsored by Bundesakademie fuer Wehrverwaltung und Wehrtechnik, Mannheim, West Germany
(MBB-509-0) Avail: Issuing Activity

Ceramic, glass, and special materials (nitrides, carbides, and borides) are considered. The use of graphite is also reviewed. Various forms which ceramics can take, including application examples, are listed. Ceramic thermomechanical properties are compared with those of metals. High temperature and chemical resistance are good, while metal better withstands thermal shock. Developments in ceramic materials are cited, including fuel rods for nuclear reactors, refractory surfaces in rockets and turbine engines, and dielectric components for aerospace technology. A significant industrial trend is seen in the use of glass fibers for optical communication. Ceramics continue to be favored for their good stability properties in high temperature, oxidizing environments. Author (ESA)

N82-28458# Massachusetts Inst. of Tech., Cambridge. Sea Grant College Program.
ENHANCEMENT OF THE STABILITY OF COMMON POLYMERIC MATERIALS AGAINST UNDERSEA DEGRADATION
R. G. Donnelly and R. E. Cohen Oct. 1981 222 p refs Sponsored by NOAA
(PB82-163015; MITSG-81-14; NOAA-81120404) Avail: NTIS HC A10/MF A01 CSCL 11I

Several common polymeric materials were subjected to small amplitude cyclic flexure in a simulated marine environment, and changes in crystallinity and molecular weight were monitored by various means, including dilute solution viscosimetry, melt viscosimetry, stress-strain measurement, and wide angle X-ray diffraction. Low density polyethylene was subjected to cyclic flexure in other environments in order to compare degradation rates therein to that in marine water. The polyethylene resin tested was treated by a variety of surface modification techniques including surfactant, absorption, radio frequency glow discharge exposure in air, post treatment with diacid or trisocyanate to form a cross polymerized coating, and surface irradiation with partially shielded 500 keV electrons. GRA

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N82-28459# Computer Sciences Corp., Bay St. Louis, Miss. Technical Services Lab.
TNT EQUIVALENCY OF CYCLOTOL 70/30 Contract Report, period ending May 1981
Larry Mars Dover, New Jersey Large Caliber Weapon Systems Lab. Apr. 1982 70 p refs
(Contract MIPR-8311-00-89)
(AD-A113270; AD-E400804; ARLCD-CR-82002) Avail: NTIS HC A04/MF A01 CSCL 19/1

Peak side-on blast overpressure and scaled positive impulse were measured for Cyclotol 70/30 using configurations that simulate in-plant processing and shipping containers. The equivalency testing addressed the hopper configuration at the end of the casting belt, transfer box, and shipping container, typical in a manufacturing facility. High explosive equivalency values for each test series were obtained as a function of scaled distance by comparison to known pressure and impulse characteristics for TNT surface bursts. GRA

N82-28460*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECT OF HYDROCARBON FUEL TYPE ON FUEL
Edgar L. Wong and David A. Bittker Jun. 1982 13 p refs (NASA-TM-82916; E-1073; NAS 1.15:82916) Avail: NTIS HC A02/MF A01 CSCL 21D

A modified jet fuel thermal oxidation tester (JFTOT) procedure was used to evaluate deposit and sediment formation for four pure hydrocarbon fuels over the temperature range 150 to 450 C in 316-stainless-steel heater tubes. Fuel types were a normal alkane, an alkene, a naphthene, and an aromatic. Each fuel exhibited certain distinctive deposit and sediment formation characteristics. The effect of aluminum and 316-stainless-steel heater tube surfaces on deposit formation for the fuel n-decane over the same temperature range was investigated. Results showed that an aluminum surface had lower deposit formation rates at all temperatures investigated. By using a modified JFTOT procedure the thermal stability of four pure hydrocarbon fuels and two practical fuels (Jet A and home heating oil no. 2) was rated on the basis of their breakpoint temperatures. Results indicate that this method could be used to rate thermal stability for a series of fuels. Author

N82-28461# Franklin Research Center, Philadelphia, Pa.
ELECTROTHERMAL ANALYTICAL RESPONSE INSPECTION OF ELECTROEXPLOSIVE DEVICES Final Report, Jun. 1979 - Dec. 1981
Charles T. Davey, Joseph F. Heffron, and Laurence V. Meyers (Army Armament Research and Development Command) Dover, N.J. Army Armament Research and Development Command Mar. 1982 139 p refs
(Contract DAAK10-79-C-0134)
(AD-A112328; AD-E400796; ARPAD-CR-82001) Avail: NTIS HC A07/MF A01 CSCL 19/1

A commercial electrothermal tester and digital equipment were used to test SCD 10383 fuses and PA506 and M100 detonators nondestructively. Dissection and examination revealed positive faults on all types of devices tested (one each). Correlation was found between various non-destructive tested (NDT) measured thermal parameters and sensitivity, burnout for fuses and fire/no fire results for detonators. The digital system that was developed represents a possible transition to on-line NDT of electroexplosive devices. The system could be set to accept or reject devices based on departure from present limits. The main limitation on the detonator testing was created by a small coefficient of thermal resistance of the bridge wire material which resulted in a poor signal-to-noise ratio. The system, if refined and used in production, would eliminate devices that are deficient in the bridge wire area. Comparisons with a collective thermal model indicate it would further permit culling sensitive or insensitive devices. GRA

N82-28462# Suntech, Inc., Marcus Hook, Pa.
AN EXPLORATORY RESEARCH AND DEVELOPMENT PROGRAM LEADING TO SPECIFICATIONS FOR AVIATION TURBINE FUEL FROM WHOLE CRUDE SHALE OIL. PART 1: PRELIMINARY PROCESS ANALYSES Interim Report, 2 Jan. - 1 Jul. 1979
H. E. Reif, J. P. Schwedock, and A. Schneider Wright-Patterson AFB, Ohio AFWAL Sep. 1981 48 p refs 3 Vol.
(Contract F33615-78-C-2024; AF Proj. 3048)
(AD-A112681; AFWAL-TR-81-2087-Pt-1) Avail: NTIS HC A03/MF A01 CSCL 21/4

Preliminary process analyses of three different technically feasible processing schemes proposed by SUN TECH, INC. for converting 100,000 BPCD of raw Paraho shale oil into military turbine fuels was investigated. Each processing scheme is based on very limited, but pertinent, data generated by SUN TECH plus literature sources. The base processing scheme consists of severe hydrotreating followed by sulfuric acid extraction; the two alternate cases utilize moderate hydrotreating plus extraction for nitrogen removal and hydrocracking. Screening-type process designs and costs estimates were prepared for each case using the economic basis specified. Results indicate that shale oil fuels refineries are more capital intensive than a comparable size petroleum refinery. No attempt was made at optimization. Author (GRA)

N82-28463# Suntech, Inc., Marcus Hook, Pa.
AN EXPLORATORY RESEARCH AND DEVELOPMENT PROGRAM LEADING TO SPECIFICATIONS FOR AVIATION TURBINE FUEL FROM WHOLE CRUDE SHALE OIL. PART 2: PROCESS VARIABLE ANALYSES AND LABORATORY SAMPLE PRODUCTION Interim Report, Jul. 1979 - 1 Nov. 1980
H. E. Reif, J. P. Schwedock, and A. Schneider Wright-Patterson AFB, Ohio AFWAL Sep. 1981 61 p refs 3 Vol.
(Contract F33615-78-C-2024; AF Proj. 2480)
(AD-A112682; AFWAL-TR-81-2087-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 21/4

Pilot plant process data have been incorporated in three design bases for manufacturing military fuels from raw Occidental shale oil. Processing schemes for 90,000 BPCD refineries to maximize either JP-4, JP-8 or to produce JP-4 plus other military fuels are presented. The processing sequence comprises moderate severity hydrotreating, fractionation, anhydrous HCl extraction and hydrocarcking. Plant capacities and product yields were not optimized. Investments for the three refinery options considered are 1.5 to 2.0 times as much as a comparable size petroleum fuels refinery. At maximum JP-4 or JP-8 production the yields are about 87 and 53 volume % of total refinery energy input, respectively. Overall, refinery thermal efficiency is > or = 75%. Inspection data are presented for five samples of specification aviation turbine fuels prepared from pilot plant operations. GRA

N82-28464# Suntech, Inc., Marcus Hook, Pa.
AN EXPLORATORY RESEARCH AND DEVELOPMENT PROGRAM LEADING TO SPECIFICATIONS FOR AVIATION TURBINE FUEL FROM WHOLE CRUDE SHALE OIL. PART 3: PRODUCTION OF SPECIFICATION OF JP-4 FUEL FROM GEOKINETICS SHALE OIL Interim Report, 1 Jan. - 1 Apr. 1980
H. E. Reif, J. P. Schwedock, and A. Schneider Wright-Patterson AFB, Ohio AFWAL Oct. 1981 45 p refs 3 Vol.
(Contract F33615-78-C-2024; AF Proj. 2480)
(AD-A112683; AFWAL-TR-81-2087-Pt-3) Avail: NTIS HC A03/MF A01 CSCL 21/4

270 Barrels of specification JP-4 jet fuel were produced by hydrorefining 890 barrels of raw Geokinetics shale oil under severe operating conditions in a continuous process development unit. On a once thru basis the yield of JP-4 off the hydrotreater was about 35 volume % of the feed. Preliminary estimates of plant investments and economics indicate that for the combination severe hydrorefining and hydrocracking, an 85 volume % yield can be attained based on total refinery energy input. Capital investments and manufacturing costs do not appear to be excessive for a shale oil refinery. GRA

N82-28465# Ballistic Research Labs., Aberdeen Proving Ground, Md.
COMBUSTION STUDIES OF VERY HIGH BURNING RATE (VHBR) PROPELLANTS
Arpad A. Juhasz, Ingo W. May, William P. Aungst, and Franz R. Lynn Feb. 1982 49 p refs
(DA Proj. 1L1-62618-AH-80)
(AD-A113029; AD-F300009; ARBRL-MR-03152) Avail: NTIS HC A03/MF A01 CSCL 21/2

The burning and impetus characteristics of a family of very high burning rate (VHBR) boron-hydride-based propellants were determined using the closed chamber technique. A systematic examination of burning behaviour vs chemical composition was made. The samples studied included bare, steel cased, and larger full bore cylindrical samples. Pressure time data were reduced to apparent linear burning rates using the conventional laminar burning assumptions made in closed chamber reductions. The results indicate that tailoring sample burning rates between 1 and 500 m/s may be possible. On the other hand, unlike conventional propellants, VHBR propellant burning rates are thought to depend not only on sample formulation but also on porosity, physical integrity, sample diameter, and confinement. These results point to a possible burning-with-breakup mechanism for these materials. GRA

N82-28466# SRI International Corp., Menlo Park, Calif.
BASIC STUDY OF FUEL STORAGE STABILITY Interim Report, 1 Mar. - 31 Mar. 1982

F. R. Mayo, S. E. Buttrill, Jr., B. Lan, and G. A. St.John 15 Apr. 1982 8 p
(Contract DAAG29-80-C-0122; SRI Proj. PYU-1924)
(AD-A114127; ARO-17062.2-E; IR-2) Avail: NTIS HC A02/MF A01 CSCL 21/4

The object of this work is to determine the mechanism by which gum and deposits are formed in diesel fuels, and thus how to predict and prevent their formation. We have been following the development of deposit precursors during oxidations of pure hydrocarbons at 130 C by field ionization mass spectrometry (FIMS), and also testing high performance liquid chromatography (HPLC) for the same purposes. HPLC might be a convenient and economical substitute for FIMS. The previous report, Interim Report No. 1 (March 22, 1982), included all useful data on this project since the joint Final Report of October 1, 1981 to NASA-Lewis and ARO. The present report includes data on deposit formation and rates of oxidation of several diesel fuels supplied by the U.S. Army Fuels and Lubricants Research Laboratory at San Antonio, done during the previous year, which have not yet appeared in any written report. Author (GRA)

N82-28467# Air Force Rocket Propulsion Lab., Edwards AFB, Calif. Mechanical Behavior and Aging Section.
AN ANALYSIS OF SOLID PROPELLANT TRANSIENT VISCOELASTIC RESPONSE UNDER MOTOR IGNITION CONDITIONS Final Report, 9 Jul. 1980 - 15 Apr. 1981
Durwood I. Thrasher and Eileen Corbett Jan. 1982 37 p
(AF Proj. 5730)
(AD-A114345; AFRPL-TR-81-55) Avail: NTIS HC A03/MF A01 CSCL 21/9

Programmable calculator programs were written to calculate stress responses for stepwise and rampwise approximations to a given strain history. These programs were tailored to calculate the error relative to the exact-history result and also to investigate different techniques of applying stepwise approximations and different techniques for selecting stress output times within each step or ramp. The optimum rampwise approximation produced one-tenth the rms error in stress produced by the optimum stepwise approximation for the same number of time intervals. Using only 10 time intervals to approximate a fourth-order polynomial strain history, the rms error in stress with the rampwise approximation was only 0.5%. The rampwise approximation program was then rewritten for analysis of an arbitrary input strain history (up to 35 ramps). A dynamic pressurization-strain test reported in AFRPL-TR-78-68 was analyzed using the rampwise strain history approximation as well as a polynomial approximation. For both strain history approximations, the stress history calculated using relaxation data agreed well with the measured stress history up to the peak stress point. GRA

N82-28468# California Univ., Livermore. Lawrence Livermore Lab.
PLANT DESIGN AND ECONOMIC ANALYSIS FOR SOLAR COAL GASIFICATION
William R. Aiman, Charles B. Thorsness, and David W. Gregg 9 Apr. 1981 20 p refs Presented at the Solar Thermal Test Facilities Users Assoc. Ann. Business and Tech. Meeting, Pasadena, Calif., 20 Apr. 1981
(Contract W-7405-eng-48)
(DE82-003178; UCRL-85821; CONF-810469-5) Avail: NTIS HC A02/MF A01

The advantage of the solar coal gasification (SCG) method, compared to a similar Lurgi plant, is conservation of coal; 40% more product can be produced from a given amount of coal. The primary detriment of SCG is an 8 hr/day operation; which leads to a higher plant investment is twice as important as the cost of the heliostat field. Providing excess heliostat capacity to maximize the output of the processing units probably is economically justified. Operating costs are lower for SCG, but capital costs are higher. In the future, as coal costs increase relative to investment costs, the SCG plant will become more economical than the Lurgi plant. DOE

N82-28469# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
RAPID HYDROPYROLYSIS OF SUB-BITUMINOUS AND BITUMINOUS COALS
P. T. Fallon and Meyer Steinberg 1981 10 p refs Presented at the IECEC Conf., Atlanta, 9 Aug. 1981
(Contract DE-AC02-76CH-00016)
(DE82-000776; BNL-30062; CONF-810812-39) Avail: NTIS HC A02/MF A01

Two subbituminous coals, New Mexico and Montana Rosebud, and two bituminous coals, Illinois No. 6 and Kentucky No. 9, were hydrogenated in a 1 in. I.D. entrained downflow tubular reactor system. Coal particles residence times varied from approximately 0.5 second to greater than 6 seconds. The New Mexico coal yielded, approximately 20% liquid hydrocarbon products at 2000 to 2500 psi and 10% at 1000 psi. The maximum gaseous hydrocarbon yield was 85% at 2500 psi and 900 C. The Montana Rosebud coal, studied at less than 2 seconds residence times and 1000 psi produced 12% liquid and 23% gaseous products. The caking bituminous coals, all run at no greater than 1000 psi, were used with diluents of limestone or sand to prevent agglomeration. The liquid yield from the Illinois No. 6 coal was 8 to 13% and the gaseous yield 34 to 43% when using limestone and 27 to 31% when using sand. DOE

N82-28470# California Univ., Livermore. Lawrence Livermore Lab.
LABORATORY-SCALE SIMULATION OF UNDERGROUND COAL GASIFICATION: EXPERIMENT AND THEORY
J. R. Creighton and C. B. Thorsness 28 Aug. 1981 26 p refs Presented at the Western States Sect. Meeting of the Combust. Inst., Tempe, Ariz., 19-20 Oct. 1981
(Contract W-7405-eng-48)
(DE82-001063; UCRL-86473; CONF-811041-2) Avail: NTIS HC A03/MF A01

Laboratory-scale experiments simulating underground coal gasification are described. A 1 cm borehole is drilled through a block of coal which is cut to fit in a 55 gallon oil drum. Inlet gas may be air or oxygen/steam mixture at various ratios. The blocks are burned for a period of several hours at a prescribed flow schedule, with appropriate instrumentation. Gas quality is found to be relatively independent of coal type for the range of sub-bituminous coals tested. After the burn the blocks of coal are cut open to examine the cavity. A mathematical modeling effort supports these experiments. The models are restricted to pure carbon, to simplify the chemistry in the model. When plug flow is assumed in the cavity the model predicts reasonable cavity shape downstream, but an incorrect shape upstream. When aerodynamic flow, including viscosity and vortex formation, is calculated in the cavity reasonable cavity shapes are obtained. DOE

N82-28471# Monsanto Research Corp., Miamisburg, Ohio.
IN-SITU COAL GASIFICATION OF BITUMINOUS COALS. A DEVELOPMENT PLAN
R. E. Zielinski and A. K. Agarwal 1981 18 p refs Presented at the 56th SPE Ann. Tech. Conf. and Exhibition, San Antonio, 5-7 Oct. 1981
(Contract DE-AC04-76DP-00053)
(DE82-002558; MLM-2873-OP; CONF-811023-6) Avail: NTIS HC A02/MF A01

Underground coal gasification (UCG). A technology that could provide for the economic production of gasoline and SNG in the eastern, high energy use markets and would provide an essentially new energy source to these markets is discussed. The high rank, thin seam, bituminous coals provide an effective target for the development of an economically viable technology for resource recovery. Tests demonstrated the feasibility of gasifying deep, thin seam, swelling bituminous coals. This test provided a 72% energy recovery by utilizing only air injection. DOE

N82-28472# Mobil Research and Development Corp., Princeton, N. J. Central Research Div.
FUNDAMENTAL STUDIES IN THE CONVERSION OF COALS TO FUELS OF INCREASED HYDROGEN CONTENT. VOLUME 1: THE CHEMISTRY AND MECHANISMS OF COAL CONVERSION TO CLEAN FUEL Interim Report, Jun. 1979 - Dec. 1980
F. J. Derbyshire, G. A. Odoerfer, L. R. Rudnick, P. Varghese, and D. D. Whitehurst Nov. 1981 251 p refs Sponsored by EPRI

(EPRI Proj. 1655-1)
(DE82-901287; EPRI-AP-2117-Vol-1) Avail: NTIS HC A12/MF A01

Coal conversions were examined at a variety of conditions. Reaction products were characterized by numerous techniques to give insight into the compositional changes occurring at short times, the influence of coal and solvent composition, and the extent of solvent coal interactions. Coal dissolution in high boiling solvents was investigated in parallel studies using pure model compounds and high boiling coal derived liquids. Procedures were developed to separate coal derived liquids into distillate and nondistillable fractions and to effect further separation on a preparative scale into different chemical classes. Liquid chromatography was used extensively to characterize the solvents and relate their composition to coal conversion. DOE

N82-28473# West Virginia Univ., Morgantown. Dept. of Chemical Engineering.
OPTIMIZATION STUDIES OF VARIOUS COAL CONVERSION SYSTEMS Quarterly Reports, 1 May - 1 Jul. 1981 and 1 Aug. - 31 Oct. 1981
C. Y. Wen, T. Tong, H. M. Huang, and H. Chen 1981 27 p refs
(Contract DE-FG22-81PC-40778)
(DE82-005208; DOE/PC-40778/T1; QR-1; QR-2) Avail: NTIS HC A03/MF A01

Two types of coal liquefier reactors are examined for the optimization of coal conversion systems: three-phase fluidized bed and bubble column of lurry reactors. These two reactors have some similarities. Both are three-phase reactors; both deal with mass transfer of gas species of gas species from gas phase into liquid and solid phases; and both involve dissolution of solid phase. The main difference between them is that solid particles have much longer residence time in three-phase fluidized beds than in bubble columns. A literature survey of three-phase fluidization is presented to clarify the hydrodynamic aspect of ebullient bed reactor design. A literature survey of the hydrodynamics of solid-liquid-gas system slurry reactors is also given. DOE

N82-28474# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ALCOHOL FUELS PROGRAM TECHNICAL REVIEW, SUMMER, 1981
1981 97 p refs
(Contract DE-AC02-77CH-00178)
(DE82-006904; DOE/TIC-2006904) Avail: NTIS HC A05/MF A01

Methanol production research activity consists of two elements: development of a pressurized oxygen gasifier and synthesis of catalytic materials to more efficiently convert synthesis gas to methanol and higher alcohols. The experimental apparatus and recent results obtained from the gasifier are reported. The catalysis research is principally directed toward producing novel organometallic compounds for use as a homogeneous catalyst. The utilization research is directed toward the development of novel engine systems that use pure alcohol for fuel. Reforming methanol and ethanol catalytically to produce H2 and CO gas for use as a fuel offers performance and efficiency advantages over buring alcohol directly as fuel in an engine. An application of this approach is also detailed. The use of fuel cells in transportation is discussed. Alternate electrolyte systems are investigated for the direct and indirect use of alcohols in fuel cells. DOE

N82-28475# Cornell Univ., Ithaca, N. Y. Dept. of Agricultural Economics.
ETHANOL PRODUCTION IN SUFFOLK COUNTY, NEW YORK: TECHNICAL AND ECONOMIC FEASIBILITY Final Report
Robert J. Kalter, Richard N. Boisvert, Eric C. Gabler, Larry P. Walker, and Roger A. Pellerin Sep. 1981 197 p Sponsored by New York Energy Research and Development Authority
(PB82-145152; NYSERDA-81-13) Avail: NTIS HC A09/MF A01 CSCL 21D

Conventional ethanol production from potatoes and corn, the candidate crops available in Suffolk County, is not strongly attractive for several reasons: storage problems, seasonality, and high cost. As for corn, which is not grown locally in large quantities, the costs of transportating corn from other locations would present a disadvantage to a plant of this type based in Suffolk County. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N82-28476# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 14, NO. 6 Monthly Report
Judith Nagle-Eshleman, ed. Jun. 1982 94 p refs
(AD-A115750) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $140.00/annual CSCL 20/11

Rotor dynamics, damping in structural joints, and seismic analysis of rotating mechanical systems are reviewed. For individual titles, see N82-28477 through N82-28479.

N82-28477# Technical Univ. of Denmark, Lyngby.
CURRENT TOPICS IN ROTORDYNAMICS RESEARCH **c37**
J. W. Lund *In* Shock and Vibration Information Center The Shock and Vibration Digest, Volume 14, No. 6 Jun. 1982 p 3-7 refs (For primary document see N82-28476 19-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $140.00/annual CSCL 20/11

Destabilizing effects due to passive forces on flexible rotors are described. Recent advances in modeling rotor/bearing systems are also summarized. Author

N82-28478# Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.
DAMPING IN STRUCTURAL JOINTS **c39**
C. F. Beards *In* Shock and Vibration Information Center The Shock and Vibration Digest, Volume 14, No. 6 Jun. 1982 p 9-11 refs (For primary document see N82-28476 19-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $140.00/annual CSCL 20/11

Increasing the inherent damping of fabricated structures without impairing the integrity of the structure by controlling the clamping forces in joints is discussed. Controlling the frequencies at which resonance occurs is considered. Although some surface damage is inevitable in joints designed to dissipate vibrational energy by relative interfacial slip, special surface preparations can reduce this damage to acceptable levels in most structures. Linearized analyses provide adequate qualitative prediction of the effects of joint damping on the vibrations of a structure. Author

N82-28479# Oklahoma State Univ., Stillwater. Dept. of Mechanical and Aerospace Engineering.
SEISMIC ANALYSIS OF ROTATING MECHANICAL SYSTEMS. A REVIEW **c37**
V. Srinivasan and A.H. Soni *In* Shock and Vibration Information Center The Shock and Vibration Digest, Volume 14, No. 6 Jun, 1982 p 13-19 refs (For primary document see N82-28476 19-31)
(Grant NSF CEE-81-08119)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $140.00/annual CSCL 20/11

Seismic analysis of rotating mechanical systems is reviewed. Rigid body models and beam models are discussed. Author

N82-28480# Westinghouse Research Labs., Pittsburgh, Pa.
ADVANCED MACHINERY LIQUID METAL WETTING, CLEANING AND MATERIALS COMPATIBILITY STUDY
W. R. Gass, G. C. Burrow, and R. E. Witkowski Mar. 1982 114 p refs
(Contract N00167-78-C-0039)
(AD-A113294; DTNSRDC/PAS-81/36) Avail: NTIS HC A06/MF A01 CSCL 13/9

Electrical machines which employ high current density liquid metal sliprings (current collectors) for current transfer often utilize alkali metals for the conducting fluids. This study was directed

at identifying and solving problems associated with the use of liquid NaK78 (78 w/o potassium, 22 w/o sodium) in prototypic machine current collectors. Areas of investigation included: interfacing of recently developed from cleaning procedures with collector electrical performance and investigating collector materials/liquid metal compatibility. This study was supported by the David Taylor Naval Ship Research and Development Center. Author (GRA)

N82-28481# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Geotechnical Lab.

GEOTECHNICAL COMPUTER PROGRAM SURVEY Final Report, Jun. 1980 - Oct. 1981

Earl V. Edris, Jr., ed. and Wipawi Vanadit-Ellis, comp. Mar. 1982 87 p refs

(AD-A114106; WES/MP/GL-82-1) Avail: NTIS HC A05/MF A01 CSCL 13/2

The results of a survey of geotechnical computer programs used in U.S. Army Corps of Engineers Offices are presented in tables listing program name, contact office/author, program number and availability, type of computer, documentation status, abstract availability, and a brief description of the program. Many of the programs are not listed in the computer program library. Author (GRA)

N82-28482# Carrier Corp., Syracuse, N.Y. Energy Systems Div.

RESIDENTIAL-SCALE ICE-STORAGE SYSTEM FOR SPACE COOLING

Harold H. Hopkinson 1981 5 p refs Presented at Ann. Contractors' Rev. Meeting on Thermal and Chem. Storage, Washington, D.C., 14-16 Sep. 1981

(Contract W-7405-eng-26)

(DE82-000165; CONF-810940-19) Avail: NTIS HC A02/MF A01

Energy load management is a necessity to electrical utilities. Thermal cool storage offers the utility a means of load management. The ice bank approach to thermal energy cool storage offers the most potential for development. Seasonal performance of both full and partial storage systems are studied using a Carrier simulation program. These results form the basis for selection of a system to be developed. A conceptual design was established, and a marketing and economic study were completed. Seasonal performance of the proposed equipment for several locations are determined by computer simulation. DOE

N82-28483# Mid-American Solar Energy Complex, Minneapolis, Minn.

PASSIVE-SOLAR CONSTRUCTION HANDBOOK

Sep. 1981 347 p refs

(Contract DE-AC02-79CS-30150)

(DE82-002455; P-101-13) Avail: NTIS HC A15/MF A01

An identification and explanation of pertinent considerations in the construction of passively solar heated buildings are presented. Toward that end, the handbook discusses solar design principles, site planning and access, system components, construction details, financial considerations and other items which are essential considerations in passive solar design. The handbook was designed for a multitude of uses: as an instructional tool in workshops and seminars; as a compendium of passive solar design elements; and, as a reference guide to building trade professionals entering passive solar construction. DOE

N82-28484# California Univ., Berkeley. Lawrence Berkeley Lab.

COMPUTERIZED, INSTRUMENTED, RESIDENTIAL ANALYSIS (CIRA)

R. C. Sonderegger, J. Y. Garnier, and J. D. Dixon Nov. 1981 8 p refs

(Contract W-7405-eng-48)

(DE82-004560; PUB-425) Avail: NTIS HC A02/MF A01

Computerized, Instrumented, Residential Analysis (CIRA) is a user-friendly program developed for microcomputers. More precisely, CIRA is a collection of programs related to building energy analysis and designed for a wide variety of microcomputers. It couples the state-of-the-art in interactive features with the latest developments in simplified computer models of building energy analysis. Descriptions are presented on how to use CIRA to describe house characteristics needed for energy analysis. Energy consumption calculations are briefly discussed. Microcomputer requirements necessary to run CIRA are noted. DOE

N82-28485# Statens Provningsanstalt, Boraas (Sweden). Lab. foer Brandtechnik.

FIRE EXTINGUISHING TESTS -80 WITH METHYL ALCOHOL GASOLINE [SLAECKFOERSOEK -80. MED METANOL-BENSIN]

Goeran Holmstedt, Anders Ryderman, Bjoern Carlsson, and Birger Lennmalm 1980 121 p refs In SWEDISH; ENGLISH summary

(SP-RAPP-1981:20) Avail: NTIS HC A06/MF A01

Large scale tests and laboratory experiments were carried out for estimating the extinguishing effectiveness of three alcohol resistant aqueous film forming foams (AFFF), two alcohol resistant fluoroprotein foams and two detergent foams in various poolfires: gasoline, isopropyl alcohol, acetone, methyl-ethyl ketone, methyl alcohol and M15 (a gasoline, methyl alcohol, isobutene mixture). The scaling down of large scale tests for developing a reliable laboratory method was especially examined. The tests were performed with semidirect foam application, in pools of 50, 11, 4, 0.6, and 0.25 sq m. Burning time, temperature distribution in the liquid, and thermal radiation were determined. An M15 fire can be extinguished with a detergent foam, but it is impossible to extinguish fires in polar solvents, such as methyl alcohol, acetone, and isopropyl alcohol with detergent foams, AFFF give the best results; and performances with small pools can hardly be correlated with results from large scale fires. Author (ESA)

N82-28486# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany). Materials and Processes Development Dept.

ADVANCED CASTING: TODAY AND TOMORROW

Dietmar Mietrach 1982 20 p refs Presented at AGARD Meeting on Adv. Casting Technol, Brussels, 4-9 Apr. 1982

Avail: NTIS HC A02/MF A01

The state of aluminum casting technology in terms of processes, component sizes, design and material-scientific data as well as mechanical characteristics was established during visits to foundries in the USA, Canada, France, Italy, Great Britain and the Federal Republic of Germany. Components of the primary structure of Tornado and ALPHA aircraft, (pylon, intake floor) classified according to the degree of difficulty during casting, were used to compare existing designs (riveted sheet metal and machined parts) and cast versions with regard to cost reduction and technical reliability. Visual inspection, dimensional checks, chemical composition analysis, penetrant tests, X-ray tests, metallographic investigations, and tensile tests were carried out. Cost savings of 25% and weight savings of 20% can be achieved by using castings. Author (ESA)

N82-28487# Portland Cement Association, Skokie, Ill. Construction Technology Labs.

COUPLED WALLS IN EARTHQUAKE-RESISTANT BUILDING: PARAMETRIC INVESTIGATION AND DESIGN PROCEDURE

Murat Saatcioglu, Arnaldo T. Derecho, W. Gene Corley, Richard A. Parmelee, and Andrew Scanlon Jul. 1981 136 p refs

(Grant NSF ENV-77-15333)

(PB82-147901; NSF/CEE-81055) Avail: NTIS HC A07/MF A01 CSCL 13M

Design information on the behavior of multi-story structures during earthquakes was developed and analyzed. Structural and ground motion parameters, their effects on dynamic response, the most significant parameters as design variables were examined. A computer program was used to investigate nonlinear response of coupled wall structures. The analytical modeling procedures used are given and the effects of structural parameters on dynamic inelastic response of coupled walls are discussed. Properties of structures with different mass for inertia are noted. General information is provided concerning earthquake resistant design and variables found to be significant in formulating a design procedure. Factors considered include the beam-to-wall stiffness ratio, wall strength, beam-to-wall strength ratio, yield deformation level and earthquake characteristics. GRA

N82-28488# Portland Cement Association, Skokie, Ill. Construction Technology Labs.

STRUCTURAL WALLS IN EARTHQUAKE-RESISTANT BUILDINGS: DYNAMIC ANALYSIS OF ISOLATED STRUCTURAL WALLS. DEVELOPMENT OF DESIGN PROCEDURE: DESIGN FORCE LEVELS Final Report

Arnaldo T. Derecho, M. Iqbal, S. K. Ghosh, Mark Fintel, W. Gene Corley, and Andrew Scanlon Jul. 1981 366 p refs (Grant NSF ENV-77-15333)

(PB82-147794; NSF/CEE-81061) Avail: NTIS HC A16/MF A01 CSCL 13M

A procedure is used to establish estimates of stiffness, strength, and deformation demands of isolated structural walls subjected to ground motions of varying intensity. The investigation characterizes earthquake ground motions to select critical input motions; indentifies the most significant structural and ground motion parameters; and formulates a simple design procedure for correlating earthquake demands with structural capacities. The computer program that was used to analyze the variables, DRAIN-2D, is described. The compilation of maximum or near-maximum values of the significant response quantities is shown to be a major step in determining design force levels for earthquake resistant structural walls. The procedure, which is based on fundamental period and flexural yield level, is illustrated for the case of twenty-story walls subjected to input motions. GRA

N82-28489# Earthquake Engineering Research Inst., Berkeley, Calif.

TWO-DIMENSIONAL HYBRID MODELLING OF SOIL-STRUCTURE INTERACTION

Tsair-Jyh Tzong, Sunil Gupta, and Joseph Penzien Aug. 1981 59 p refs (Grant NSF PFR-79-08979)

(PB82-142118; UCB/EERC-81/11; NSF/CEE-81042) Avail: NTIS HC A04/MF A01 CSCL 13M

A hybrid model formed by partitioning a soil structure system into a near field and a far field was used to analyze three dimensional soil structure interaction problems. The near field which consists of the structure and a finite region of soil around it is modeled by the finite element method. The far field which accounts for the loss of energy due to stress waves traveling away from the foundation is modeled through continuous impedance functions. The same technique is applied to the two dimensional case. To determine the two dimensional frequency dependent impedance functions, a method of system identification is used to insure that the resulting hybrid model reproduces the known compliances of an infinite rigid strip on an elastic half space. These impedance functions have been employed to calculate the compliances of the strip for different R/a ratios. Good agreement between the computed and known compliances is shown. GRA

N82-28490# Cornell Univ., Ithaca, N. Y. College of Engineering.

COMPUTER-AIDED INJECTION MOLDING SYSTEM Final Report

K. K. Wang, S. F. Shen, J. F. Stevenson, C. Cohen, and C. A. Hieber Aug. 1981 48 p refs (Grant NSF DAR-74-11490)

(PB82-147810; NSF/MEA-81012) Avail: NTIS HC A03/MF A01 CSCL 13H

Results are presented of research undertaken to: (1) identify and solve rheological problems of injection molding; (2) develop numerical analysis techniques for simulating the injection molding process; (3) establish quantitative guidelines for mold design; (4) evaluate existing part descriptors for applications to mold design and manufacture; and (5) develop and implement an integrated computer aided design/manufacturing system as a prototype. It was found that mold filling can be scientifically predicted to an acceptable degree of accuracy for industrial applications not only for simple molds but also for industrial molds with fairly complex geometries. Sophisticated numerical schemes (finite difference, finite element, and a hybrid of the two) were developed to simulate molding dynamics. The feasibility of automating the mold design procedures through effective computer use was demonstrated. GRA

N82-28491# National Bureau of Standards, Washington, D.C. National Engineering Lab.

ANALYSIS OF DATA FROM THE ENERGY MONITORING AND CONTROL SYSTEM AT THE NORRIS COTTON FEDERAL OFFICE BUILDING

Nov. 1981 98 p refs Sponsored in part by DOE

(PB82-138744; NBSIR-81-2358) Avail: NTIS HC A05/MF A01 CSCL 13A

The Norris Cotton Federal Office Building (NCFOB) was designed to serve as a demonstration and a feasibility test for energy conserving building features. A building energy monitoring and control system was operated as a data acquisition system over a 13 month period ending in September 1980. Experience encountered during the checkout and operation of the system is discussed. Results from data reduction procedures used to calculate approximately 160 parameters describing the energy performance of the building are presented on a monthly basis. Hourly data are also presented for daily building operation profiles, building envelope performance, and performance of the mechanical systems. Author (GRA)

N82-28492# National Bureau of Standards, Washington, D.C. Engineering Lab.

NBS/ESDS: A COMPUTER MODEL FOR THE SIMULATION OF HOT WATER SYSTEMS

C. A. Wan Aug. 1981 65 p refs

(PB82-139361; NBSIR-81-2303) Avail: NTIS HC A04/MF A01 CSCL 13A

A computer model, entitled NBS/ESDS, was developed using a finite difference method to simulate the generation, storage and distribution of a hot water system commonly found in many residences, commercial facilities or industrial facilities. The conduction heat equation which governs the heat transfer in the water heater during all modes of operation, and the heat transfer in the distribution pipe network during its cool down periods, is solved. A solution is also obtained for the pipe flow equation which governs the heat transfer in the distribution pipe network during the draw periods. Thermal stratification of water is modeled. A plug flow model is used to simulate the draw of heated water from the water heater. GRA

N82-28493# Bureau of Mines, Rolla, Mo. Research Center.

CONSOLIDATION OF AN IRON-BASE SUPERALLOY BY POWDER METALLURGY TECHNIQUES

J. F. McIlwain and L. A. Neumeier Oct. 1981 29 p refs

(PB82-135906; BM-RI-8556; LC-80-607851) Avail: NTIS HC A03/MF A01 CSCL 13H

The consolidation of an iron base superalloy (20% Cr, 5% each Ni and Mn, 1% each C, W, Mo, and Cb, and the balance Fe) and its modifications by powder metallurgy (P/M) techniques were investigated. Vacuum atomized, prealloyed powder was used. Consolidation was by sintering of cold pressed alloy powder, or by forging plus rolling or extrusion of canned powder. Several commercial lubricants were evaluated in the pressing operation. GRA

N82-28494# Centre National d'Etudes Spatiales, Toulouse (France).

COMPUTER-ASSISTED CIRCUIT DESIGN MASKS FOR THE PRODUCTION OF MICROWAVE CIRCUITS

Jean-Luc Sedard 1981 57 p Transl. into ENGLISH of the mono. "Conception de Circuits Assistee par Ordinateur Realisation de Masques pour l'elaboration de Circuits Micro-Ondes" France Original language document was announced as N81-15197

(PB82-140153; CNES-NT-95) Avail: NTIS HC A04/MF A01 CSCL 13H

Microwave circuit masks are made using high precision equipment which very often is not absolutely essential. In fact, lined width corresponding to a given impedance and line length corresponding to fractions of wavelengths are determined with an accuracy which is far lower than that of the apparatus used to produce the masks. From this standpoint, a computer and its graphical peripherals (cathode tracer COM 330) allow these difficulties to be overcome and a full scale mask to be produced directly on 35 mm film. The production and control of the definition tests line width spacing, the trace program versus user data, applications and examples and visualization are discussed. GRA

N82-28495# Electricity Council Research Centre, Capenhurst (England).
HIGH GRADIENT MAGNETIC SEPARATION APPLIED TO LIQUID-LIQUID SEPARATION
A. P. King Oct. 1981 41 p refs
(PB82-142811; ECRC/R-1486) Avail: NTIS HC A03/MF A01 CSCL 13H

A state of the art report on de-emulsification by high gradient magnetic separation is presented. The factors affecting the design and performance of the magnetic separator cell are discussed. The limitations and potential of this technique are examined.
Author (GRA)

N82-28496# Metropolitan Washington Council of Governments, D. C.
AN EVALUATION OF STRATEGIES TO CONTROL NOISE FROM AIR CONDITIONING AND REFRIGERATION CONDENSING UNITS
George L. Durden, John O. Myers, Thomas A. Towers, and Donna McCord Dickman Dec. 1981 148 p refs
(Contract EPA-68-01-3952)
(PB82-165903; EPA-550/9-81-404) Avail: NTIS HC A07/MF A01 CSCL 13A

Noise from air conditioning and refrigeration condensing units is investigated. The practical aspects of attempting to implement innovative approaches are emphasized. These included: (1) sample selection, (2) noise measurement survey, (3) implementation of aggressive abatement procedures, (4) development and use of a screening graph for determining acceptability of sound rated outdoor unitary equipment, (5) incorporation of noise control considerations, (6) exploration of an operatinal curfew, and (7) development of an incentive/information program. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking*.

N82-28497 Royal Signals and Radar Establishment, Malvern (England).
BURIED INSULATED ANTENNAS
D. J. Brammer Oct. 1981 28 p refs
(RSRE-Memo-3418; BR81874) Copyright. Avail: Issuing Activity

Two methods for determining the design parameters of buried antennas, transmission line and moment techniques, are described. In the transmission line method, the central conductor, the insulation and the higher permittivity lossy ground for a line which supports a traveling wave are considered. If the radius of the insulation < wavelength, and the complex dielectric constant changes appreciably across the insulator ground boundary, only the lowest order mode is nonevanescant. Backward signals can result for certain types of central conductor currents. In the moment method, the buried antenna is divided into elements and the reaction of one element on another in the presence of the interface above and the dielectric insulator is calculated. This method allows a more realistic antenna configuration, including earth spikes, loading and tapering of the insulation of the antenna, as well as considering the effect of the interface. The two methods agree well with each other and with calculated values. Author (ESA)

N82-28498 Royal Signals and Radar Establishment, Malvern (England).
A BROADBAND WAVEGUIDE TRANSFER STANDARD FOR THE DISSEMINATION OF UK NATIONAL MICROWAVE POWER STANDARDS
J. P. Ide Jan. 1982 23 p refs
(RSRE-Memo-3390; BR83016) Copyright. Avail: Issuing Activity

A portable transfer standard which enables WG16 power meters to be calibrated in terms of British standards over the range 10 mW to 1 W at frequencies of 8.2, 9.0, 10.0 and 12.4 GHz is described. It consists of a commercial high directivity WG16 20 dB coupler with a thermistor mount on the side arm. The mount is contained within a temperature controlled enclosure, thermally and electrically isolated from the waveguide. The coupler feeds a fixed fraction of the microwave power in the waveguide to the thermistor where it is measured using a dc substitution technique. The sum of microwave and dc power dissipated in the thermistor is maintained constant by a self balancing bridge. The calibration factor is the ratio of the microwave power present at the ouput port to the microwave power indicated by the bridge. This ratio is found by using national standards to measure power at the output port for each frequency. Test and uncertainty analysis results are satisfactory. Author (ESA)

N82-28499# Communications Research Centre, Ottawa (Ontario). Information Technology and Systems Branch.
TELIDON VIDEOTEX PRESENTATION LEVEL PROTOCOL: AUGMENTED PICTURE DESCRIPTION INSTRUCTIONS
C. D. OBrien, H. G. Brown, J. C. Smirle, Y. F. Lum, J. Z. Kukulka, and A. Kwan, ed. Feb. 1982 183 p refs
(CRC-TN-709-E) Avail: NTIS HC A09/MF A01

The Telidon Videotex system is a method by which graphic and textual information and transactional services can be accessed from information sources by the general public. In order to transmit information to a Telidon terminal at a minimum bandwidth, and in a manner independent of the type of communications channel, a coding scheme was devised which permits the encoding of a picture into the geometric drawing elements which compose it. These picture description instructions are an alpha geometric coding model and are based on the primitives of POINT, LINE, ARC, RECTANGLE, POLYGON, and INCREMENT. Text is encoded as (ASCII) characters along with a supplementary table of accents and special characters. A mosaic shape table is included for compatibility. A detailed specification of the coding scheme and a description of the principles which make it independent of communications channel and display hardware are provided. J.D.

N82-28500*# Linkabit Corp., San Diego, Calif.
A SIMULATION SYSTEM FOR VALIDATING THE ANALYTICAL PREDICTION OF PERFORMANCE OF THE CONVOLUTIONAL ENCODED AND SYMBOL INTERLEAVED TDRSS S-BAND RETURN LINK SERVICE IN A PULSED RFI ENVIRONMENT Final Report
9 Jul. 1981 215 p refs
(Contract NAS5-25985)
(NASA-CR-170428; NAS 1.26:170428) Avail: NTIS HC A10/MF A01 CSCL 17B

A hardware integrated convolutional coding/symbol interleaving and integrated symbol deinterleaving/Viterbi decoding simulation system is described. Validation on the system of the performance of the TDRSS S-band return link with BPSK modulation, operating in a pulsed RFI environment is included. The system consists of three components, the Fast Linkabit Error Rate Tester (FLERT), the Transition Probability Generator (TPG), and a modified LV7017B which includes rate 1/3 capability as well as a periodic interleaver/deinterleaver. Operating and maintenance manuals for each of these units are included.
Author

N82-28501*# Intermetrics, Inc., Cambridge, Mass.
SYSTEM ARCHITECTURE STUDY OF AN ORBITAL GPS USER TERMINAL
Daniel P. Martin and Clark M. Neily, Jr. 7 Oct. 1980 50 p refs
(Contract NAS5-25819)
(NASA-CR-166821; NAS 1.26:166821; IR-607) Avail: NTIS HC A03/MF A01 CSCL 17B

The generic RF and applications processing requirements for a GPS orbital navigator are considered. A line of demarcation between dedicated analog hardware, and software/processor implementation, maximizing the latter is discussed. A modular approach to R/PA design which permits several varieties of receiver to be constructed from basic components is described. It is a basic conclusion that software signal processing of the output of the baseband correlator is the best choice of transition from analog to digital signal processing. High performance sets requiring multiple channels are developed from a generic design by replicating the RF processing segment, and modifying the

applications software to provide enhanced state propagation and estimation. Author

N82-28502*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD AND APPARATUS FOR DELTA K SYNTHETIC APERATURE RADAR MEASUREMENT OF OCEAN CURRENT Patent Application
Atul Jain, inventor (to NASA) (JPL) Filed 18 Mar. 1982 11 p
(Contract NAS7-100)
(NASA-Case-NPO-15704-1; US-Patent-Appl-SN-359382) Avail: NTIS HC A02/MF A01 CSCL 17I

A synthetic aperture radar is employed for delta k measurement of ocean current from a spacecraft without the need for a narrow beam and long observation times. The SAR signal is compressed to provide image data for different sections of the chirp bandwidth, equivalent to frequencies f sub 1 (ta,t), f sub 2 (ta,t), f sub n (ta,t), and a common area for the separate image fields is selected. The image for the selected area at each frequency is deconvolved to obtain the image signals for the different frequencies (f sub 1, f sub 2, f sub m) and the same area. A product of pairs of signals is formed, Fourier transformed and squared. The spectrum thus obtained for different areas for the same pair of frequencies f sub jk, f sub j+n,k are added to provide an improved signal to noise ratio. The shift of the peak from the center of the spectrum is measured and compared to the expected shift due to the phase velocity of the Bragg scattering wave. Any difference is a measure of current velocity v sub c. NASA

N82-28503*# Illinois Univ., Urbana-Champaign. Electromagnetics Lab.
NASA ADAPTIVE MULTIBEAM PHASED ARRAY (AMPA): AN APPLICATION STUDY Final Report, 15 Jan. - 30 Apr. 1982
R. Mittra, S. W. Lee, and W. Gee May 1982 78 p refs
(Grant NAG3-149)
(NASA-CR-169125; NAS 1.26:169125) Avail: NTIS HC A05/MF A01 CSCL 20N

The proposed orbital geometry for the adaptive multibeam phased array (AMPA) communication system is reviewed and some of the system's capabilities and preliminary specifications are highlighted. Typical AMPA user link models and calculations are presented, the principal AMPA features are described, and the implementation of the system is demonstrated. System tradeoffs and requirements are discussed. Recommendations are included. A.R.H.

N82-28504 Royal Signals and Radar Establishment, Malvern (England).
A TRUE LOGARITHMIC IF FREQUENCY AMPLIFIER FOR RADAR APPLICATIONS
L. M. Davies and E. W. Scott 1981 45 p refs
(RSRE-Memo-3400; BR82754) Copyright. Avail: NTIS HC A03/MF A01

Evaluations of 6, 7, and 8 stage logarithmic amplifiers, incorporating specially designed integrated circuits and a 50 ohm buffer output stage are summarized. The 6 stage amplifiers give > 60 dB dynamic range with 2 db accuracy. Good phase and gain tracking are obtained with change of signal level at room temperature, and with change of temperature and fixed input signal level. The 7 stage amplifier performs similarly, except that dynamic range is at least 70 dB, With 3 dB accuracy. The 8 stage amplifier does not yield any increase in dynamic range over the 7 stage version. It tends to saturate at -5 dBm CW input signal level. Good differential tracking of phase is reported for amplifiers at 30 and 60 MHz for all amplifiers. The IF pulse response is good for the 6 and 8 stage amplifiers. Author (ESA)

N82-28505# Signatron, Inc., Lexington, Mass.
NONLINEAR SYSTEM IDENTIFICATION TECHNIQUE VALIDATION Final Technical Report, May 1980 - Jul. 1981
Michael Rudko and Julian J. Bussgang Griffiss AFB, N.Y. RADC Jan. 1982 105 p refs
(Contract F30602-80-C-0104; AF Proj. 2338)
(AD-A112593; A276-4; RADC-TR-81-391) Avail: NTIS HC A06/MF A01 CSCL 17/2

This final technical report describes the results obtained by SIGNATRON, Inc. of Lexington MA on Air Force Contract F30602-80-C-0104 for Rome Air Development Center. The objective of this effort is to develop a technique for identifying system response of nonlinear circuits by measurements of output response to known inputs. The report describes results of a study into the system identification technique based on the pencil-of-function method previously explored by Jain (1974) and Ewen (1979). The procedure identified roles of the linear response and is intended as a first step in nonlinear response and is intended as a first step in nonlinear circuit identification. There are serious implementation problems associated with the original approach such as loss of accuracy due to repeated integrations, lack of good measures of accuracy and computational iteration to identify the number of poles. GRA

N82-28506# White Sands Missile Range, N.Mex. Instrumentation Directorate.
IRIG-TIME SYNCHRONIZED BINARY VIDEO DATA INSERTER Final Report
Federico Salvatti, Jr. Sep 1981 28 p
(AD-A107119; STEWS-ID-81-2) Avail: NTIS HC A03/MF A01 CSCL 17/2

The Binary Video Inserter (BVI) was developed to insert binary data into a video signal. A Video Synchronizer was developed to synchronize the BVI to IRIG-B range time. The combination provides a Synchronized Binary Video Inserter (SBVI) in support of a program to replace film-based mobile cinetheodolite instrumentation presently in use at WSMR. The SBVI satisfies the following objectives: synchronizes shuttered video cameras to IRIG-B time; provides timing and control signals to achieve high frame rate capability for recording launch area and miss distance event data; insert time, instrument encoder data, and other data into the video signal for computer-assisted processing; and provide error recovery capability for the inserted data. Author (GRA)

N82-28507# Panametrics, Inc., Waltham, Mass.
THEORETICAL INVESTIGATION OF ABSORPTIVE PROCESSES Final Report, 1 Apr. 1979 - 1 Apr. 1981
Norman E. Pedersen, Jeanne C. Pedersen, and Peter C. Waterman Aberdeen Proving Ground, Md. Army Research and Development Command May 1981 10 p refs
(Contract DAAG29-79-0053)
(AD-A107278; PANA-04; ARO-16608.1-P) Avail: NTIS HC A02/MF A01 CSCL 20/3

With the ultimate goal of developing computer codes for obtaining the transmission and reflection properties of conductive particle clouds, progress is described in both the computation of electromagnetic cross sections of conductive fibers, and the radiative transfer effects governing the behavior of clouds of such fibers. Author (GRA)

N82-28508# National Academy of Sciences - National Research Council, Washington, D. C. Commission on Human Resources.
MODEL OF DIRECT INITIATION OF UNCONFINED DETONATIONS Interim Report, Jan. - Feb. 1981
S. Eidelman Mar. 1981 25 p refs
(Contract N00228-79-C-A414)
(AD-A107446; NPS67-81-02CR) Avail: NTIS HC A02/MF A01 CSCL 19/4

An analytical model of the direct initiation of detonation waves with planar, cylindrical, and spherical symmetry is developed. This model shows that the energy requirements for the self-sustained detonation wave differ significantly for planar, cylindrical and spherical detonations. The new concept of minimum compensation energy was introduced and the technique of calculation of minimum initiation energy was developed. The results are verified by numerical simulation of the full governing equations and by comparison to experimental data. Author (GRA)

N82-28509# Pacific-Sierra Research Corp., Santa Monica, Calif.
A NUMERICAL METHOD FOR USING A RAY TRACING PROGRAM TO COMPUTE RADIO FIELDS IN REGIONS OF STRONG FOCUSING Final Report, Apr. 1980 - Jun. 1981

R. E. Warren, R. N. DeWitt, and C. R. Warber Griffiss AFB, N.Y. RADC Mar. 1982 52 p refs
(Contract F19628-80-C-0065; AF Proj. 4600)
(AD-A113913; PSR-1121; RADC-TR-82-45) Avail: NTIS HC A04/MF A01 CSCL 20/14

Radio fields are computed in regions of strong focusing, using ray intercept data provided by a standard ray tracing program. The procedure extends the usefulness of the ray trace by allowing fields to be computed near caustics and cusps where ray density calculations fail. Using a plane wave decomposition of the field components, phase integrals are computed by curve fitting intercepts of ray traced through ionospheric or tropospheric media whose refractive indices vary arbitrarily with altitude. A numerical algorithm is described for performing the plane wave angular spectral integrations. This procedure avoids the complications associated with higher order asymptotic techniques, allowing a much broader range of refractivity index profiles to be analyzed by a single method. It is applied to two sample profiles, and the results agree very closely with higher order stationary phase estimates in caustic regions. Moreover, the computer code runs efficiently, despite the presence of highly oscillatory integrands. GRA

N82-28510# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
DEVELOPMENT OF A GOOD-QUALITY SPEECH CODER FOR TRANSMISSION OVER NOISY CHANNELS AT 2.4 kb/s Final Report, Aug. 1980 - Mar. 1982
V. R. Viswanathan, M. Berouti, A. Higgins, and W. Russell Mar. 1982 192 p refs
(Contract DCA100-80-C-0039)
(AD-A114068; BBN-4916) Avail: NTIS HC A09/MF A01 CSCL 17/2

This report describes the development, study, and experimental results of a 2.4 kb/s speech coder called harmonic deviations (HDV) vocoder, which transmits good-quality speech over noisy channels with bit-error rates of up to 1%. The HDV coder is based on the linear predictive coding (LPC) vocoder, and it transmits additional information over and above the data transmitted by the LPC vocoder, in the form of deviations between the speech spectrum and the LPC all-pole model spectrum at a selected set of frequencies. At the receiver, the spectral deviations are used to generate the excitation signal for the all-pole synthesis filter. The report describes and compares several methods for extracting the spectral deviations from the speech signal and for encoding them. To limit the bit-rate of the HDV coder to 2.4 kb/s the report discusses several methods including orthogonal transformation and minimum-mean-square-error scalar quantization of log area ratios, two-stage vector-scalar quantization, and variable frame rate transmission. The report also presents the results of speech-quality optimization of the HDV coder at 2.4 kb/s. GRA

N82-28511# Computer Systems Management, Inc., Arlington, Va.
THE DESIGN, DEVELOPMENT AND APPLICATION OF ADVANCED VIDEO AND MICROCOMPUTER-BASED COMMAND AND CONTROL (C2) SYSTEMS Semiannual Technical Report, 1 Oct. 1981 - 31 Mar. 1982
James F. Wittmeyer, III, Theodore M. Heath, Keith A. Olson, and Milton J. Schultz, III Apr. 1982 79 p refs
(Contract MDA903-80-C-0155; ARPA Order 3829)
(AD-A113742; CSM-82-01) Avail: NTIS HC A05/MF A01 CSCL 17/2

Videodisc systems vary in capability but most are applicable to Command and Control requirements especially training and data retrieval. A professional non-broadcast video system can be configured at a cost less than $75K. The Hand-Held Computer has applications for DoD but not without certain reservations. A low-cost, off-the-shelf package may be assembled to build an electronic notepad. Author (GRA)

N82-28512# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
A CLASS OF EFFICIENT CONTENTION RESOLUTION ALGORITHMS FOR MULTIPLE ACCESS CHANNELS
Jeannine Mosely and Pierre Humblet Mar. 1982 34 p refs
(Contract N00014-75-C-1183; Grant NSF ECS-79-19880; ARPA Order 3045; NR Proj. 049-383)
(AD-A113840; LIDS-P-1194) Avail: NTIS HC A03/MF A01 CSCL 17/2

A discrete time multiaccess channel is considered where the outcome of a transmission is either idle, success or collision, depending on the number of users transmitting simultaneously. Messages involved in a collision must be retransmitted. An efficient access allocation policy is developed for the case where infinitely many sources generate traffic in a Poisson manner and can all observe the outcomes of the previous transmissions. Its rate of success is 0.48776. Modifications are presented for the cases where the transmission times depend on the transmission outcomes and where observations are noisy. Author (GRA)

N82-28513# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MAXIMUM LIKELIHOOD SPECTRAL ESTIMATION AND ITS APPLICATION OF NARROWBAND SPEECH CODING
Robert J. McAulay 5 Mar. 1982 36 p refs
(Contract F19628-80-C-0002; AF Proj. 2283; AF Proj. 411L)
(AD-A114070; TR-602; ESD-TR-82-006) Avail: NTIS HC A03/MF A01 CSCL 17/2

Using the maximum likelihood (ML) method the Itakura-Saito 1 spectral matching criterion is generalized to aperiodic and periodic processes having arbitrary model spectra. For the all-pole model, Kay's 2 covariance domain solution to the exact ML problem is cast into the spectral domain and used to obtain the exact solution for periodic processes. It is shown that if the number of independent power measurements greatly exceeds the model order, then the ML algorithm reduces to a pitch-directed, frequency domain version of Linear Predictive (LP) spectral analysis. Using a real-time vocoder based on the exact ML analysis revealed that, in contrast to standard LPC, the synthetic speech has the quality of being heavily smoothed. This suggests that it is generally incorrect to interpret LPC spectral matching in terms of the Itakura-Saito criterion. Author (GRA)

N82-28514# Texas Technological Univ., Lubbock. Dept. of Mathematics.
NONPARAMETRIC ESTIMATION OF SIGNALS MIXED WITH NOISE Final Technical Report, 1 Dec. 1980 - 30 Sep. 1981
Kamal C. Chanda Feb. 1982 11 p refs
(Grant AF-AFOSR-0058-81; AF Proj. 2304)
(AD-A113018; AFOSR-82-0255TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Analysis of a set of evolutionary or nonstationary time series data is traditionally carried out by the use of regression and spectral methods. Although these procedures are, to some extent, nonparametric in nature, the basic assumption implicit in such data analysis has usually been that the time series is Gaussian or nearly so. We do not know very well how efficient and useful these procedures are in case the data structure is distinctly non-Gaussian. Classical data analysts who handle data sets composed of independent observations have noticed over the last three decades that robust and adaptive nonparametric methods have worked very efficiently even for situations where large implicit variability in the data has effectively ruled out a Gaussian model. Author (GRA)

N82-28515# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DIELECTRIC LENS ANTENNA FOR EHF AIRBORNE SATELLITE COMMUNICATION TERMINALS
Walter Rotman and Joseph C. Lee 16 Feb. 1982 38 p refs
(Contract F19628-80-C-0002; AF Proj. 2029; AF Proj. 6430)
(AD-A113250; TR-592; ESD-TR-82-002) Avail: NTIS HC A03/MF A01 CSCL 09/5

A mechanically-steerable dielectric lens antenna, suitable for installation in an ENF airborne MILSATCOM terminal on high performance aircraft, was designed and tested. The antenna system consists of a six-inch diameter plano/convex lens with a dual frequency feed (43.5-45.5 GHz for the uplink and 20.2-21.2 GHz for the downlink). The measured gain and half-power beamwidths of the antenna system are 35.5 dB and a 3.2 deg for the uplink (44.5 GHz) and 29.5 dB and 6.0 deg for the downlink (20.7 GHz), corresponding to overall aperture efficiencies of 71% and 81%, respectively. The first sidelobes are -18 dB for the downlink and -20 dB for the uplink while the corresponding far-out sidelobes are less than -26 dB and -34 dB, respectively, for all angles beyond 18 deg. These characteristics are compatible

with a high ECCM capability for an antenna of this size in an aircraft. Author (GRA)

N82-28516# Harris Corp., Melbourne, Fla. Government Communication Systems Div.

TENT SHAPED PHASED ARRAY RESTS Final Technical Report

C. A. Chuang Griffiss AFB, N.Y. RADC Jan. 1982 100 p (Contract F19628-79-C-0173; AF Proj. 4600)
(AD-A113191; RADC-TR-81-281) Avail: NTIS HC A05/MF A01 CSCL 20/14

This final report presents experimental results for a breadboard phased array. The breadboard consists of 24 square waveguide and septum polarizer elements, diode phase shifters, a feed network, and a microprocessor array controller. The breadboard is a part of a tent-shaped phased array SHF aircraft antenna for satellite communications. The tent array consists of four planar phased arrays and has a low profile streamlined configuration. It provides electrical scanning over a hemisphere and is capable of high power transmission. The design of the array is a trade-off of the key parameters including gain, coverage, aerodynamic impact, high power transmission, and array packaging. A study was performed to drive an optimum array configuration. Design considerations and study results were presented in the Interim Report. Experimental testing of the breadboard reported herein verified the concept of the tent-shaped phased array. Additional breadboard tests and further studies are recommended. The designs of 20 dB and 30 dB gain tent arrays are included.
Author (GRA)

N82-28517# Army Construction Engineering Research Lab., Champaign, Ill.

EVALUATION OF APPLICABILITY OF STANDARD CW EMI/RFI SHIELDING EFFECTIVENESS TEST TECHNIQUES TO ASSESSMENT OF EMP HARDNESS OF TACTICAL SHELTERS Final Report

Roy Axford, Ray McCormack, and Raj Mittra Mar. 1982 61 p refs
(Contract MIPR-FY76-20810-0019)
(AD-A113042; CERL-TR-M-307) Avail: NTIS HC A04/MF A01 CSCL 14/2

This report investigates the validity of analytical techniques for converting continuous wave (CW) test data to values for electromagnetic pulse (EMP) to measure the EMP hardness of tactical shelters. MIL-STD-285 and specifications for CW testing IEEE 299 specify measurements in the near field using dipole and loop antennas. Consequently, the test wavefronts are spherical, rather than planar, as in the case of an EMP. Thus, correction factors for EMP needed to be developed. Author (GRA)

N82-28518# Army Construction Engineering Research Lab., Champaign, Ill.

PREPARING AND COMMUNICATING HABITABILITY DESIGN INFORMATION Final Report

Roger L. Brauer, Kim Grosbeck, and Cynthia McNeilly Jan. 1982 94 p refs
(DA Proj. 4A7-62731-AT-41)
(AD-A113379; CERL-TR-P-121) Avail: NTIS HC A05/MF A01 CSCL 05/2

Design information is prepared by many organizations to provide a basis for quality control, standardization, and cost containment in constructed facilities. Usually, this information is used by many people other than designers to evaluate existing facilities, plan renovations or new construction projects, define detailed requirements, or design a project. This report discusses a method for developing habitability design information and communicating it effectively to help insure that it is used. The procedure explains how to manage the process of developing habitability design information, including planning a document, collecting and evaluating resource materials, and writing and formatting habitability design information. Information needs of typical readers are defined, and many examples, including important format features, are provided to assist the readers. Principles of writing habitability design information documents are summarized. Author (GRA)

N82-28519# Defence Research Establishment, Ottawa. (Ontario). Electronic Warfare Div.

FREQUENCY COMPRESSION OF WIDEBAND SIGNALS USING A DISTRIBUTED SAMPLING TECHNIQUE

L. J. Conway Nov. 1981 133 p refs
(AD-A113428; DREO-R-852) Avail: NTIS HC A07/MF A01 CSCL 09/5

Present methods of frequency conversion include heterodyne conversion and harmonic or subharmonic generation. These methods have inherent limitations which restrict their usefulness in a number of applications. A novel frequency compression/expansion system which makes use of sampling techniques is not confined to the same limitations as these conventional frequency conversion systems. The unique integration of delay lines, sampling gates and amplifiers permits frequency compression or expansion as well as amplification of wideband pulsed RF signals at frequencies far above the cut-off frequencies of the amplifying devices used. The theory and design of the frequency compression/expansion system is presented in this report. The theoretical results are compared with those obtained from an experimental system and good agreement is demonstrated.
Author (GRA)

N82-28520# Naval Research Lab., Washington, D. C. Target Characteristics Branch.

HIGH-RESOLUTION RADAR SEA SCATTER, EXPERIMENTAL OBSERVATIONS AND DISCRIMINANTS Interim Report

James P. Hansen and Vincent F. Cavaleri 5 Mar. 1982 53 p refs
(SF12141491)
(AD-A113394; NRL-8557) Avail: NTIS HC A04/MF A01 CSCL 17/9

An experimental study was made of the characteristics of high-resolution, low-incidence-angle, radar sea scatter. The experiment utilized measurement made with several radar systems with varying pulsewidth, frequency, and polarization while the radar-illuminated sea surface was observed optically. Measurements were performed at both shallow-water and deep-water sites, and they revealed that all high-resolution, X-band radar, sea return is heavily amplitude modulated pulse-to-pulse, with modulation frequencies significantly higher than those expected from rigid targets. Moreover, under many conditions of wind and sea the backscatter in individual range-resolution cells was found to be characterized by significant periods of extremely low level return interspaced between relatively high level spikes. High-level returns were often associated with turbulent breaking water, as indicated by whitecaps. Some marked distinguishing features were also noted in the spatial and time-varying characteristics of the high-resolution sea scatter as a function of radar polarization. For upwind conditions and vertical polarization, it was observed that backscatter was consistently evident from many portions of the nonshadowed sea surface, while horizontal polarization produced sporadic returns, often with a 'burstlike' character. The distribution and level of the data taken with vertical polarization generally agreed with those taken at lower resolution by other researchers, while the data taken with horizontal polarization tended to be more nonexponential in character. GRA

N82-28521# Naval Surface Weapons Center, Dahlgren, Va. Electronics Systems Dept.

EXPERIMENTAL TIME-DOMAIN DETERMINATION OF COMPLEX RESONANCES OF SIMPLE OBJECTS Final Report

Bruce Z. Hollmann and Edwin D. Ball Dec. 1981 33 p refs
(AD-A113168; NSWC/TR-80-414) Avail: NTIS HC A03/MF A01 CSCL 17/9

The time-domain range for transmitting a subnanosecond pulse and recording its return from a conducting object is described in this report. The advantages and problems associated with Prony's algorithm are given; the efforts and progress toward overcoming the problems are described; and the results of applying Prony's algorithm to the returns from a hemisphere and a cylinder are shown. The areas of need, both theoretical and experimental, are detailed. Author (GRA)

N82-28522# Hughes Aircraft Co., Fullerton, Calif.

NEAR FIELD ANTENNA MEASUREMENT SYSTEM Final Report, 29 Aug. 1977 - 29 Oct. 1981

Alan E. Holley Ft. Monmouth, N.J. Army Electronics Research and Development Command Mar. 1982 111 p refs
(Contract DAAB07-77-C-0587)
(AD-A114125) Avail: NTIS HC A06/MF A01 CSCL 17/9

This report describes the development and evaluation of a fully automated self-contained near field antenna measurement facility. A description of the system and its normal operation is included. The development of each major subsystem is described and the evaluation procedures and results are detailed. Finally, recommendations for further development are given. In summary, the system has shown the feasibility of performing complex antenna measurements in a highly time-effective production mode while retaining accuracies comparable to typical far field ranges. Author (GRA)

N82-28523# TRW Defense and Space Systems Group, Redondo Beach, Calif.
MULTIFUNCTION MULTIBAND AIRBORNE RADIO ARCHITECTURE STUDY Final Report, Apr. 1978 - Jan. 1980
L. N. Ma, S. K. Ogi, M. Y. Huang, L. L. Bodnar, and P. Martin Wright-Patterson AFB, Ohio AFWAL Jan. 1982 379 p refs
(Contract F33615-77-C-1172; AF Proj. 2003)
(AD-A114427; AFWAL-TR-81-1113) Avail: NTIS HC A17/MF A01 CSCL 17/2

The demands of modern military avionic communication, radio navigation, and cooperative identification (CNI) equipment has been greatly expanded as the result of the need for antijam (AJ), low probability of intercept (LPI), higher navigation accuracy, and increased volume of information transfer. These demands are verified in programs such as GPS, JTIDS, SEEK TALK, SINCGARS and AFSAT I and II. The cost of this additional capability has severely hampered the ability of the Government to procure new CNI systems and equipment with desired performance capabilities. The problem is further compounded by the lack of available space in the tactical aircraft, the transition of new equipment into the inventory, and the retention of many current systems. The multifunction multiband airborne radio system (MFBARS) program is formulated to explore the feasibility of producing a modern CNI system at an affordable life cycle cost (LCC) and within real estate requirements. A cost effective system approach was developed that revolved around high technology RF-LSI analog components that are in the development stage, high speed digital pre-processor elements and a programmable signal processor all under control of a host processor configuration. This design trades the ultimate gain in volume, weight and life cycle cost against a reasonable risk for the mid 1980's development. Author (GRA)

N82-28524# Westinghouse Research and Development Center, Pittsburgh, Pa.
LABORATORY DEMONSTRATION ELECTROMAGNETIC LAUNCHER: PRELIMINARY HAZARD ANALYSIS
D. W. Deis 29 Jan. 1982 27 p refs
(Contract DAAK10-79-C-0110; Grant ARPA Order 3732)
(AD-A114154; Rept-82-9J6-EMACK-R1) Avail: NTIS HC A03/MF A01 CSCL 19/6

The results of the preliminary hazard analysis on the Laboratory Demonstration Electromagnetic Launcher are described. This analysis was based on system concepts and inherent known hazards. This work has concluded that although serious hazards do exist, a properly designed laboratory and detailed operating plan can ensure personnel safety and minimize the potential for system or component damage. Author (GRA)

N82-28525# Lincoln Lab., Mass. Inst. of Tech., Lexington.
A 20 GHz CIRCULARLY POLARIZED, FAN BEAM SLOT ARRAY ANTENNA
Dennis C. Weikle 9 Mar. 1982 39 p refs
(Contract F19628-80-C-0002)
(AD-A114291; TR-563; ESD-TR-82-001) Avail: NTIS HC A03/MF A01 CSCL 09/5

An EHF waveguide slot array was developed for possible use as a receive-only paging antenna for ground mobile terminals. The design, fabrication, and measured performance of this antenna are presented. The antenna generates a circularly polarized fan beam that is narrow in azimuth and broad in elevation. When mechanically rotated in azimuth, it can receive a 20 GHz satellite transmission independent of mobile terminal direction. Azimuth plane sidelobe levels, which are typically <-40 dB from the main lobe, provide for discrimination against ground and airborne jammers. Author (GRA)

N82-28526# Bell-Northern Research Ltd., Ottawa (Ontario).
A VIRTUAL SPACE VIDEO CONFERENCING DEMONSTRATION SYSTEM Final Report
Apr. 1982 25 p
(Contract MDA903-81-C-0180)
(AD-A114120; P379/TRA6735) Avail: NTIS HC A02/MF A01 CSCL 17/2

This report describes a system that was constructed to demonstrate and study the subjective effects of switching delay in a virtual space video conferencing system and presents some preliminary results of the subjective evaluations. The concept of virtual space video teleconferencing provides geographically separated participants with a visual environment that very closely simulates a meeting room where all participants are physically present. At each site, TV camera/monitor pairs representing the remote participants are located in front of the physically present participant in approximately the same positions as these participants would occupy if they were seated around a meeting table in the same room. The local participant can at any time choose which monitor (participant) he wishes to watch and, by the head and eye positions as seen on the monitors, he can determine where the other participants are looking as well. A virtual space conference consisting of N single participant sites would require (N x (N-1)) TV camera/monitor pairs, and presenting a continuous video signal to each monitor would require as many dedicated video channels. By taking advantage of the fact that a participant can view only one monitor at a time, and utilizing a transmission scheme which dynamically allocates a single incoming video channel to each site to carry the signal for the monitor currently in view, the total video channel requirement can be reduced significantly. GRA

N82-28527# Bell-Northern Research Ltd., Ottawa (Ontario).
A MULTI-BIT RATE INTERFACE MOVEMENT COMPENSATED MULTIMODE CODER FOR VIDEO CONFERENCING Final Report
Apr. 1982 91 p refs
(Contract MDA903-81-C-0180; DARPA Order 4121)
(AD-A114121; P379/TR6735) Avail: NTIS HC A05/MF A01 CSCL 17/2

This report describes a multi-bit rate video coder for DARPA video conferencing applications. The coder can operate at any preselected transmission bit rate ranging from 1.5 Mb/s to 64 kb/s. The proposed National Command Authority Teleconferencing System (NCATS) is designed to connect several conferencing sites. The system provides shared audio, video and graphic spaces. The video conferencing system communicates dynamic images of participants to different conferencing sites. The system is designed to operate under different bandwidth constraints. Under emergency situations communications bandwidth can be drastically reduced to allow only for 64 kb/s to carry out the video conferencing system. Under normal conditions larger channel capacity is available for this service. In order to accommodate the above requirements, a video codec that can operate at different transmission bit rates is needed. This allows for upgrading of picture quality when there is sufficient bandwidth and a graceful reduction of picture quality under severe bandwidth limitations. The NTSC colour video signal sampled at 14.3 MHz (4 times the colour subcarrier frequency) and uniformly quantized to 8 bits per picture element, requires a transmission bit rate of 114 Mb/s. Such a high bit rate is economically prohibitive especially for video conferencing applications. In order to reduce the transmission bit rate, redundant information in the signal has to be removed and the specific video conferencing environment has to be exploited. GRA

N82-28528# Bell-Northern Research Ltd., Ottawa (Ontario).
AUDIO CONFERENCING USING DYNAMIC CHANNEL-ASSIGNMENT SYSTEM Final Report
Apr. 1982 25 p refs
(Contract MDA903-81-C-0180)
(AD-A114122; P379/tR6735) Avail: NTIS HC A02/MF A01 CSCL 17/2

This study examines dynamic channel assignment techniques

to demonstrate their feasibility in audio teleconferencing. Computer simulation of dynamic assignment is used to investigate the rules for controlling the bit-rate and is used to subjectively evaluate the speech quality of audio conferencing system. Efficient encoding of speech signals requires the removal of redundancies in the speech waveform. Predictive codings techniques are applicable to dynamic channel assignment. Adaptive Predictive Coding at 16 kbps is suitable for a high quality/high rate channel. The closely related technique of Linear Predictive Coding is appropriate for a low quality/low rate channel. A dual-mode coder combines both the above techniques together with a switching control algorithm. The control algorithm selects the mode of the dual-mode coder based on the relative amplitudes of the conference participants. Computer simulations of a dual-mode coder indicate that the technique is well suited to audio conferencing. Dynamic assignment of the coding mode introduces only minor quality degradations when proper control algorithms are used. The overall impression is one of high quality coding for most of the duration of the conference. GRA

N82-28529# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.

S-BAND RADAR PULSE DENSITIES IN THE LOS ANGELES AREA Final Report

R. J. Matheson, J. D. Smiley, and V. S. Lawrence Washington FAA Aug. 1981 85 p

(Contract DTFA01-81-Y-10535)

(AD-A114116; DOT-FAA-RD-82-17) Avail: NTIS HC A05/MF A01 CSCL 20/14

This report contains results of spectrum occupancy measurements made of the 2700-3100 MHz radar bands in the Los Angeles, CA, area. Approximately 500 sets of measurements were made, which included peak pulse amplitude, as well as the number of pulse counts at three threshold levels measured in 1 MHz frequency increments. These measurements have been combined and are displayed in this report in graphs showing the maximum, average, and minimum amplitude and pulse counts in 1 MHz frequency increments (400 samples). These measurements were made for the Federal Aviation Administration (FAA) by the Institute for Telecommunication Sciences (ITS) using the Radio Spectrum Measurement System, a computer-controlled spectrum analyzer system. The measurements will be used to quantify the S-band electromagnetic environment expected to be encountered with NEXRAD, a Doppler weather radar currently under development. Author (GRA)

N82-28530# Bell-Northern Research Ltd., Ottawa (Ontario).

NETWORK SPECIFICATIONS FOR A VIRTUAL SPACE TELECONFERENCING SYSTEM Final Report

Apr. 1982 43 p

(Contract MDA903-81-C-0180)

(AD-A114119) Avail: NTIS HC A03/MF A01 CSCL 20/14

This note outlines the network requirements to provide a flexible experimentation environment for a special video/visual teleconferencing system. To make this as selfcontained as possible Section 2 will provide a description of the conferencing environment. This will carefully define the concept of a 'virtual space', a 'pseudo virtual space', and various 'partial virtual spaces'. Each of these conferencing environments imposes different requirements on the interconnecting nodal network. Section 3 will describe the connectivities, capacities, and switching requirements for each of the conferencing environments. Section 4 will introduce a set of canonical network topologies and capabilities that can be configured to satisfy the requirements of the various spaces. Section 5 describes in more detail the requirements and a potential design for a local network to support a cluster of teleconferencing nodes. Section 6 describes the internodal network. Section 7 describes the cluster controller for the system. Finally Section 8 describes the requirements for a demonstration network. Section 9 concludes and Section 10 suggests future research. Author (GRA)

N82-28531# Ames Lab., Iowa.

ELECTRODYNAMICS: A CONSEQUENCE OF NONLINEAR REALIZATIONS OF THE LORENTZ GROUP

B. Dalton 1981 40 p refs Presented at the Conf. held in New Orleans, May 1981

(Contract W-7405-eng-82)

(DE82-004775; IS-M-355) Avail: NTIS HC A03/MF A01

Extensions from the representations of the Lorentz group to include local nonlinear diagonal transformations is sufficient to generate, via the covariant derivative, the interaction of minimal coupling. These diagonal realizations are charactrized by six functions ph/sub i/ which must satisfy a system of transformation equations. Inequivalent categories of solutions for the phi/sub i/ give rise to different electromagnetic fields. The Dirac monopole and Coulomb potentials follow directly from two different categories of these nonlinear realizations. Within this theory, charge becomes simply the nonlinear counterpart of intrinsic spin for a particular nonlinear realization of the Lorentz group. Charge is thus placed on equal footing with intrinsic spin in the sense that both phenomena can be described as consequences of our space-time symmetry. Other solutions for the six phi/sub i/ exist, including a spinor. We briefly discuss the possibility that with these other solutions, these realizations could represent some other basic properteries of elementary particles. DOE

N82-28532# Sandia Labs., Albuquerque, N. Mex. Ground Motion and Seismic Div.

PORTABLE RANDOM NUMBER GENERATOR FOR USE IN SIGNAL PROCESSING

Samuel D. Stearns Oct. 1981 17 p refs

(Contract DE-AC04-76DP-00789)

(DE82-006831; SAND-81-1933) Avail: NTIS HC A02/MF A01

A very simple and highly portable algorithm for generating independent random numbers distributed uniformly over (0,1) is presented. In its simplest form the algorithm requires only six lines of FORTRAN code. It requires an integer word length of at least 32 bits. The algorithm is described and presented in two simple versions. Its properties relating particularly to signal processing applications are presented. DOE

N82-28533# Fondazione Ugo Bordoni, Rome (Italy).

AVAILABILITY ANALYSIS OF A MULTIPLEX SYSTEM [ANALISI DELLA DISPONIBILITA' DI UNA APPARECCHIATURA MULTIPLEX]

Antonio Leccece (Telespazio S.p.A.), Achille Pattavina, and Aldo Roveri (Rome Univ.) Dec. 1981 13 p In ITALIAN

(FUB-30-1981) Avail: NTIS HC A02/MF A01

The availability probability in a mathematical model of a multiplex system is analyzed. The model asumes S multiplexing level and Z lines per group and level, giving a total of N = Z to the S power signal paths. The method to compute the probability of having available at least p inlet-outlet paths is described. An exanple refering to a numerical multiplexing unit of 4th order (from 2048 Mbit/sec to 139264 Mbit/sec) is presented. For given malfunction and repairing frequencies the availability is computed as a function of the number of paths in utilization. Author (ESA)

N82-28534# Fondazione Ugo Bordoni, Rome (Italy).

METHODOLOGY FOR THE DESCRIPTION AND VALIDATION OF COMMUNICATION PROTOCOLS [METODOLOGIE PER LA DESCRIZIONE E PER LO CONVALIDA DEI PROTOCOLLI DI COMUNICAZIONE]

Achille Pattavina, Aldo Roveri (Rome Univ.), and Sebastiano Trigila Dec. 1981 30 p refs In ITALIAN

(FUB-31-1981) Avail: NTIS HC A03/MF A01

The models which may be used for the formal description of communication protocols, such as those required for complex computer networks, are analyzed and compared. Two types of models are studied: (1) the abstract automata models including finite state machines, UCLA graphs, Petri nets and formal grammars, and (2) the algorithmic models based on high level programming languages, including sequential languages, such as Pascal, Simula, PL/1, and concurrent languages such as Concurrent Pascal and Chill. Advantages and difficulties are found in both type of models. The evolution of hybrid models is mentioned. Author (ESA)

N82-28535# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Inst. fuer Hochfrequenztechnik.

OFFSET REFLECTOR ANTENNAS: DESIGN, COMPUTATION, CONSTRUCTION AND PATTERN MEASUREMENTS
Dieter Klement, Hans-Juergen Steiner, and Volker Stein Nov. 1981 69 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-770)
(DFVLR-Mitt-81-33) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 28,80

The test of active and passive methods for the purpose of object recognition in the frequency region from 32 to 90 GHz, requiring a series of antennas with different half beam widths and with an axial symmetric radiation pattern for orthogonal linear polarizations is considered. These requirements are met by the principle of a single offset-reflector antenna with a corrugated feed. The design procedure for this antenna system is described. Computation of the scattered pattern is based on the current distribution method. The primary pattern is determined by experiment as well as theory. For construction of the antennas, a fiberglass technique was applied, combined with a special method for shaping the parabolic reflectors. Measured and computed results show the validity of the established design rules. Author (ESA)

N82-28536# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
COST EFFECTIVE COMMUNICATION WITH THE ELECTRONIC, MICROPROCESSOR-CONTROLLED SPC TELEPHONE SYSTEM EMS
Winfried Bochnig and Juergen Matare 1982 6 p Repr. from Telecom Rept., v. 4, no. 1, 1981 p 40-43
(MBB-512-82-O) Avail: Issuing Activity

A telephone system, installed in a company of some 10,000 employees, is described. It was selected above all to replace the series-connected telephones previously used and to standardize the terminal units. The high degree of vesatility of the EMS system is emphasized. Significant qualitative advantages include: better organized telephone traffic; the system can be easily expanded; automatic charge registration; and users are more easily reached. Quantitative advantages are: less space required due to miniturization of electronic components; reduced equipment rental with the removal of the series-connected telephones; and increased system security due to self-supervision and fault diagnosis programs. Author (ESA)

N82-28537# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Betriebsbereich.
MORE EASE IN COMMUNICATION [MEHR KOMMUNIKATIONS-KOMFORT]
J. Matare 1981 4 p Repr. from Industriemagazin, Feb. 1981 p 76-78 In GERMAN
(MBB-513-82-O) Avail: Issuing Activity

Features of an electronic, microprocessor-controlled telephone system are reviewed. The handset is decribed. Options that can be activated with the program keys on the handset are: automatic callback; automatic redialling; call diversion; and individual abbreviated dialing. Communication problems, e.g., line busy, no answer, two callers are speaking when a third wants to join in, are considered. Besides program keys, other features that make it possible to overcome these problems are: add-on (three-party) conference switch; loudspeaker; and individual charge registration. First results in the use of this system show considerable advantages over conventional telephone technology. Author (ESA)

N82-28538# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.
ELECTROMAGNETIC WAVE TRAJECTORIES AT VHF AND HIGHER FREQUENCIES
H. T. Dougherty Oct. 1981 63 p refs
(PB82-134289; NTIA-CR-81-14) Avail: NTIS HC A04/MF A01 CSCL 17B

The basics of conventional ray tracing are adapted for the point-to-point telecommunications problem. The formulation of Millington is extended to identify a wave trajectory, that specific trajectory launched from a source that also reaches a predetermined receiving location. The single wave trajectory of the standard or well-mixed atmosphere is described, and the multiplicity of wave trajectories in the ducting environment is defined. The resulting engineering expressions are used in numerical examples to demonstrate some interesting aspects of duct propagation. A brief discussion relates these wave trajectories to the problem of defining hybrid ray-mode solutions of the full-wave ducting problem and the need for further development of both wave trajectories and hybrid solutions. GRA

N82-28533# Cambridge Univ. (England). Dept. of Engineering.
AN INTEGRATED COMMUNICATIONS DEMAND MODEL
C. F. Doubleday Nov. 1980 60 p refs
(PB82-141292; CUED/F-CAMS/TR-205-1980) Avail: NTIS HC A04/MF A01 CSCL 17B

A computer model of communications demand is being developed to permit dynamic simulations of the long-term evolution of demand for communications media in the U.K. to be made under alternative assumptions about social, economic and technological trends in British Telecom's business environment. The context and objectives of the project and the potential uses of the model are reviewed, and four key concepts in the demand for communications media, around which the model is being structured are discussed: (1) the generation of communications demand; (2) substitution between media; (3) technological convergence; and (4) competition. Two outline perspectives on the model itself are given. GRA

N82-28540# Federal Communications Commission, Washington, D. C. Office of Science and Technology.
A REPORT OF THE TECHNOLOGICAL ASPECTS OF REGULATORY-POLICY ISSUES OF GEOSTATIONARY PLATFORMS
Satyen Das Dec. 1981 35 p refs
(PB82-142191; FCC/OST-R81-1) Avail: NTIS HC A03/MF A01 CSCL 17B

Geostationary platforms and their possible application to low cost communication services are discussed. A number of regulatory technology, policy issues related to the introduction of a geostationary platform, e.g., organizational arrangements for platform operation, electromagnetic compatibility at orbit environment, sharing with terrestrial services and other satellites, diversity operation, frequency reuse, small orbit spacing and efficient modulation techniques are considered. Some technological policy issues may require demonstrated results before a commercially viable geostationary platform is implemented by investors and approved by regulators. GRA

N82-28541# Cambridge Univ. (England). Dept. of Engineering.
COMPUTER PROGRAM DESCRIPTION: AN IMPROVED FINITE ELEMENT PROGRAM FOR THREE-DIMENSIONAL ELECTROMAGNETIC PROBLEMS
J. P. Webb Oct. 1981 53 p refs
(PB82-134636; CUED/B-ELECT/TR-65; ISSN-0309-7412) Avail: NTIS HC A04/MF A01 CSCL 20N

The program described may be used to find the three dimensional time harmonic electric or magnetic field in a volume containing linear, sourceless, isotropic materials with varying and lossy permitivity or permeability. In general the program has application in cases for which the geometry does not permit a reduction in the dimension of the underlying three dimensional differential equations. The program may be used to find the field patterns and resonant frequencies of loaded cavities. It may also be used to solve a wide range of waveguide scattering problems, by first formulating them as loaded cavity problems. GRA

N82-28542# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
THE FREQUENCY SHIFT OF A PULSE BY A TIME-INDEPENDENT, DISPERSIVE, LOSSY MEDIUM
R. M. Jones Sep. 1981 24 p refs
(PB82-161977; NOAA-TM-ERL-WPL-80; NOAA-81120311) Avail: NTIS HC A02/MF A01 CSCL 20N

A pulse undergoes a frequency shift while propagating through a medium whose losses depend on frequency. The amount of the frequency shift is proportional to the imaginary part of the complex group refractive index and the distance traveled in the medium. No new frequencies are generated that were not in

the original signal; the signal energy is merely 'redistributed' by selective absorption. In an inhomogeneous medium, the frequency shift is proportional to the imaginary part of the complex group path. Furthermore, a beam propagating in a medium where the losses depend on the direction of propagation will be bent toward the direction of least attenuation. Again, no components in the angular spectrum are generated that were not in the original beam. The signal energy is merely redistributed by selective absorption. GRA

N82-28543# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
BENDING OF A RAY IN A RANDOM INHOMOGENEOUS MEDIUM
R. M. Jones Aug. 1981 28 p ref Presented at the U.R.S.I. Intern. Symp. on Electromagnetic Wave Theory, Tbilisi (USSR), 9-15 Sep. 1971
(PB82-148966; NOAA-TM-ERL-WPL-77; NOAA-81102004) Avail: NTIS HC A03/MF A01 CSCL 20N

When a wave propagates through a random, inhomogeneous medium, the random component of the refractive index affects not only the random component of the ray direction but also the mean component. Likewise, the mean component of the refractive index affects not only the mean component of the ray direction, but also the random component. Equations based on a perturbation expansion that can be used to calculate the mean and random component of the ray direction in a medium in which the mean and random component of the refractive index vary arbitrarily in three dimensions are described. The equations are suitable for numerical integration in a ray tracing program. GRA

N82-28544# National Bureau of Standards, Boulder, Colo. Engineering Lab.
EARTH TERMINAL MEASUREMENT SYSTEM MAINTENANCE MANUAL, ADDENDUM
John P. Wakefield Oct. 1981 50 p refs Sponsored in part by Army Communications Command
(PB82-151994; NBSIR-81-1641) Avail: NTIS HC A03/MF A01 CSCL 17B

This addendum to the Earth Terminal Measurement System Maintenance Manual, NBSIR 78-895, describes the equipment and maintenance procedures required to support the retrofit package for the Earth Terminal Measurement System (ETMS) developed by the National Bureau of Standards. This retrofit adds a multiinput port relay module which provides the capability of connecting three receiver channels to the ETMS, thereby enabling measurement of pertinent earth terminal parameters at as many as three frequencies in a single measurement pass. This manual does not include measurement theory nor measurement operating procedures that are described in the Earth Terminal Measurement System Operation Manual, NBSIR 78-879. GRA

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics*.

N82-28545* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PHOTOELECTRIC DETECTION SYSTEM Patent
James R. Currie and Raymond R. Schansman, inventors (to NASA) Issued 9 Mar. 1982 7 p Filed 30 Apr. 1980 Supersedes N80-25134 (18 - 15, p 2057)
(NASA-Case-MFS-23776-1; US-Patent-4,319,133; US-Patent-Appl-SN-145272; US-Patent-Class-250-214; US-Patent-Class-250-221) Avail: US Patent and Trademark Office CSCL 09A

A photoelectric beam system for the detection of the arrival of an object at a discrete station wherein artificial light, natural light, or no light may be present is described. A signal generator turns on and off a signal light at a selected frequency. When the object in question arrives on station, ambient light is blocked by the object, and the light from the signal light is reflected onto a photoelectric sensor which has a delayed electrical output but is of the frequency of the signal light. Outputs from both the signal source and the photoelectric sensor are fed to inputs of an exclusively OR detector which provides as an output the difference between them. The difference signal is a small width pulse occurring at the frequency of the signal source. By filter means, this signal is distinguished from those responsive to sunlight, darkness, or 120 Hz artificial light. In this fashion, the presence of an object is positively established.
Official Gazette of the U.S. Patent and Trademark Office

N82-28546 Royal Signals and Radar Establishment, Malvern (England).
HIGH SPEED SAW SPECTRUM ANALYSER DATA HANDLING
T. I. Browning Feb. 1982 22 p refs
(RSRE-Memo-3450; BR83015) Copyright. Avail: Issuing Activity

Two LSI interface circuits used in data handling with a GHz SAW compressive receiver are presented, and demonstration units to go with the system are described. The serial circuit consists of a 64 bit shift register capable of a clock rate > or = 250 MHz. Data are fed in at this high rate and can be held then read out at a slower speed < or = 40 MHz. The serial/parallel circuit consists of a 16 bit shift register capable of being clocked at rates > 250 MHz. Input data can be held and latched in a 16 bit parallel output. Serial outputs are also available, so these circuits can be cascaded to give any output bit width. Boards can be stacked together, providing greater bandwidth cover and/or greater dynamic range. Multifrequency CW or pulsed signals can be handled. Author (ESA)

N82-28547# SRI International Corp., Menlo Park, Calif.
IMPACT OF ADVANCED POWER SEMICONDUCTOR SYSTEMS ON UTILITIES AND INDUSTRY Final Report
D. P. Masher and J. S. Smith Palo Alto., California Electric Power Research Inst. Nov. 1981 103 p refs
(EPRI Proj. 1201-12)
(DE82-901286; EPRI-EM-2112) Avail: NTIS HC A06/MF A01

The impact that power semiconductors and power conditioning and control (PCC) systems might have on national electrical energy consumption is evaluated. Advanced PCC systems are being incorporated into ac motor drives, lamp ballasts, switching power supplies, and controls for home applicances. Substantial system efficiency improvements are realized when the appropriate PCC system is applied to an existing inefficient process. Three generic PCC systems were identified as having sufficient economic incentives to affect national electrical energy consumption because of their inherent conservation potential. While the potential benefits appear attractive, harmonic currents/voltage, low power factors, and electromagnetic interference generated by PCC systems can lead to a degradation in the present quality of grid power. DOE

N82-28548# Lincoln Lab., Mass. Inst. of Tech., Lexington.
ACOUSTOOPTIC TIME-INTEGRATING CORRELATORS AND OPTOELECTRONIC MIXERS Annual Report, 1 Feb. 1981 - 31 Jan. 1982
Arthur G. Foyt and Richard C. Williamson 31 Jan. 1982 37 p refs
(Contract F19628-80-C-0002; AF Proj. 2300)
(AD-A114149; ESD-TR-82-008) Avail: NTIS HC A03/MF A01 CSCL 09/5

Research during the past year has been concentrated on the developement of the InP optoelectronic switch and on the evaluation of this switch as an electronic mixer. This type of mixer appears well suited for use in a time-integrating correlator which employs a heterodyne detector array. In such an array, a small high-quality mixer is crucial. InP optoelectronic switches have been fabricated using interdigitated-finger electrode structures with finger and space lengths varying from 6 micrometers for the most widely spaced device to 1.25 micrometers for the most closely spaced device and active

areas of 48 x 48 micrometers. The performance of these devices in both the conventional (switch) mode and the bilinear mode of mixing has been evaluated. GRA

N82-28549*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HERMETICALLY SEALABLE PACKAGE FOR HYBRID SOLID-STATE ELECTRONIC DEVICES AND THE LIKE Patent Application
Wilson N. Miller (Rockwell International, Anaheim, Calif.) and Ormal E. Gray, inventors (to NASA) (Rockwell International, Anaheim, Calif.) Filed 25 Jun. 1982 13 p Sponsored by NASA
(NASA-Case-MSC-20181-1; US-Patent-Appl-SN-392093) Avail: NTIS HC A02/MF A01 CSCL 09A

A light weight, inexpensively fabricated, hermetically sealable, repairable package for small electronic or electromechanical units, having multi connections is described. A moulded ring frame of polyamide-imide plastic (Torlon) is attached along one edge to a base plate formed of a highly heat conducting material, such as aluminum or copper. Bores are placed through a base plate within the area of the edge surface of ring frame which result in an attachment of the ring frame to the base plate during moulding. Electrical leads, are moulded into the ring frame. The leads are L shaped gold plated copper wires imbedded within widened portions of the side wall of the ring frame. Within the plastic ring frame wall the leads are bent (typically, although not necessarily at 90 deg.) so that they project into the interior volume of the ring frame for connection to the solid state devices. NASA

N82-28550*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A dc TO dc CONVERTER Patent Application
Albert E. Willis, John M. Gould, Jack L. Matheney, and Harrison Garrett, inventors (to NASA) Filed 28 May 1982 17 p Sponsored by NASA
(NASA-Case-MFS-25430-1; US-Patent-Appl-SN-383083) Avail: NTIS HC A02/MF A01 CSCL 09A

A rectangular wave signal generated by a high frequency oscillator is divided down to a selected frequency by divider and then fed to a ring counter which develops six square wave signals varying in time by 30 deg. Each of these signals is then amplified and fed to one of six output transformers, each of which has an S(1) winding and an S(2) winding. The S(1) series set of windings are connected in series to form a second set. The two sets are connected in series in a closed loop or circle. The various phased signals are combined via a first rectifier in the form of an SCR, connected between a terminal at each two windings of the series and the direct current positive output terminal. A rectifier is connected from the same terminal point to the zero or negative terminal of the output. By varying the turn on time of the SCRs as a function of the output voltage, output voltage can be regulated. NASA

N82-28551# Varian Associates, Palo Alto, Calif. Solid State Lab.
INTEGRATED BALANCED FETS FOR BROADBAND MILLIMETER WAVE AMPLIFIERS Final Report, 1 Apr. 1980 - 30 Jun. 1981
S. Bandy, C. Nishimoto, P. Stonestrom, Y. Chai, and C. Hooper Aug. 1981 32 p refs
(Contract N00014-80-C-0391; RF62581801; NR Proj. 251-043)
(AD-A107526) Avail: NTIS HC A03/MF A01 CSCL 09/5

Using electron-beam exposure and MBE GaAs, balanced FETs were designed and fabricated. While the devices exhibited excellent dc characteristics, their single-sided RF performance was not up to expectations, for reasons yet to be determined. This report is an interim account of a program being continued under a different contract number (N00014-81-C-0270). GRA

N82-28552# Boeing Aerospace Co., Seattle, Wash.
FEASIBILITY STUDY OF A 270V dc FLAT CABLE AIRCRAFT ELECTRICAL POWER DISTRIBUTED SYSTEM Final Report, Dec. 1980 - Jan. 1982
M. J. Musga and R. J. Rinehart Jan. 1982 272 p refs
(Contract N62269-81-C-0231)
(AD-A114026; D182-10816-1; NADC-82023-60) Avail: NTIS HC A12/MF A01 CSCL 10/2

This report documents the efforts of a one man-year feasibility study to evaluate the usage of flat conductors in place of conventional round wires for a 270 volt direct current aircraft power distribution system. This study consisted of designing electrically equivalent power distribution harnesses in flat conductor configurations for a currently operational military aircraft. Harness designs were established for installation in aircraft airframes which are: (1) All metal, or (2) All composite, or (3) a mixture of both. Flat cables have greater surface areas for heat transfer allowing higher current densities and therefore lighter weight conductors, than with round wires. Flat cables are less susceptible to electromagnetic effects. However, these positive factors are partially offset by installation and maintenance difficulties. This study concludes that the extent of these difficulties can be adequately limited with appropriate modification to present installation and maintenance practices. A comparative analysis of the flat and the round conductor power distribution harnesses was made for weight, cost, maintenance and reliability. The knowledge gained from the design and comparative analysis phases was used to generate design criteria for flat power cable harnesses and to identify and prioritize flat cable harness components and associated production tooling which require development. GRA

N82-28553# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
CONVERSION OF ALGORITHMS TO CUSTOM INTEGRATED CIRCUIT DEVICES Final Report, 15 Apr. 1980 - 14 Mar. 1981
Jonathan Allen Mar. 1982 29 p refs
(Contract F49620-80-C-0073; AF Proj 2304)
(AD-A113822; AFOSR-82-0309TR) Avail: NTIS HC A03/MF A01 CSCL 09/3

This project studies the way in which high level functional descriptions can be converted through a succession of representations by means of local transformations to a final mask specification. A major focus of the work is the determination of the form of these representations, as well as the nature of the transformations between them. Major emphasis has been devoted to the specification of high level algorithms, in a way such that performance variations can be studied, either through the use of constraint representations, or by use of conflict avoidance schemes that permit the systematic exploration of various degrees of parallelism inherent in an algorithm. Following architectural determination through exploration of space/time tradeoffs, various well-formedness tests are executed, including topology extraction, circuit extraction logic verification, design rule checking, timing analysis, and circuit simulation. In addition, testability is characterized and test vectors are generated. Following the well formedness checks, which are under development. Using these techniques it is possible to generate modules, ascertain their well formedness, connect them into clusters at the next higher level of the overall system hierarchy, and continue interatively until the entire design is complete. GRA

N82-28554# Michigan Univ., Ann Arbor. Electron Physics Lab.
MICROWAVE CIRCUIT ANALYSIS AND SYNTHESIS Final Report, Jul. 1977 - Apr. 1981
G. I. Haddad, R. K. Mains, D. F. Peterson, R. Actis, J. R. East, R. K. Froelich, and D. Yang Wright-Patterson AFB, Ohio AFWAL Dec. 1981 36 p
(Contract F33615-77-C-1132; AF Proj. 2002)
(AD-A113560; AFWAL-TR-81-1219) Avail: NTIS HC A03/MF A01 CSCL 09/5

This final report is a brief description of the work carried out under this program. In addition to the work reported here, several technical reports have been issued which describe in detail the work performed under this program. These reports are available and are considered as a part of this final report. The work carried out under this program included the following: properties of controlled avalanche transit-time (CATT) triode amplifiers, properties of high-efficiency X-band GaAs IMPATTs including single- and double-drift devices as well as CW and pulsed operation, power combining studies including fundamental and harmonic power combining, GaAs FET modeling, characteriza-

tion and circuit studies, and development of a model to study the effects of energy and momentum relaxation effects on IMPATT device performance particularly at millimeter wavelengths.
Author (GRA)

N82-28555# E-Systems, Inc., St. Petersburg, Fla.
ELECTRONICALLY TUNABLE AMPLIFIER TECHNOLOGY Final Technical Report, 2 Jan. 1980 - 2 Mar. 1981
Mark A. Harris Griffiss AFB, N.Y. RADC Jan. 1982 105 p refs
(Contract F30602-80-C-0059; AF Proj. 2338)
(AD-A113193; RADC-TR-81-375) Avail: NTIS HC A06/MF A01 CSCL 09/5

The development and design of an electronically tuned, frequency tracked filter pair based on a combination of classical microwave filter cavity designs and an electronically tuned resonator design technique is described. The filters, consisting of a 100 watt two pole filter and a 1000 watt single pole resonator, are intended to be placed at the input and output of a frequency hopping UHF power amplifier to reduce the broadband noise and spurious signal outputs of the resulting electronically tunable amplifier. The improvement in EMC (eletromagnetic compatibility) performance allows the amplifier to be used in environments with other equipment. The design of each of the electronically tuned filters is based on a previously developed method of tuning a high power resonator with PIN diode switched capacitors. The correlation of the design of both the combined input filter and the coaxial resonator output filter to the electronically tuned resonator with the susceptance slope parameters required is developed with mathematical models presented in the report. The primary result of this research is the development of an experimental model filter pair which demontrates the feasibility of operating at power levels compatible with a 1000 watt power amplifier and tuning within the 350 to 400 MHz band in less than 60 microseconds. GRA

N82-28556# E-Systems, Inc., St. Petersburg, Fla.
ELECTRONICALLY TUNABLE PHASE LOCKED LOOP OSCILLATOR Final Technical Report, 10 Mar. 1980 - 12 Jun. 1981
Mathew Balasis, Michael R. Davis, and Charles R. Jackson Griffiss AFB, N.Y. RADC Feb. 1982 149 p refs
(Contract F30602-80-C-0133; AF Proj. 2338)
(AD-A113253; GO-62244; RADC-TR-81-400) Avail: NTIS HC A07/MF A01 CSCL 09/5

This report describes the design and development of a low noise, high power, variable oscillator incorporating a high 'Q' electronically tunable resonator as the frequency determining element. The VCO provides improved EMC performance in phase locked synthesizers which are a part of communications equipments. The oscillator combines a low noise VMOS transistor with the selectivity and out-of-band attenuation of a coaxial resonator to provide superior EMC performance. Several oscillator designs were examined and the basis for the final configuration is presented. Oscillator noise is discussed and models for analysis are explained. A brass board model was constructed and tested and the technical results are presented. GRA

N82-28557# Hughes Aircraft Co., Torrance, Calif. Electron Dynamics Div.
MULTIMODE AMPLIFIER Final Technical Report
Arthur L. Rousseau and Ivo Tammaru Griffiss AFB, N.Y. RADC Feb. 1982 50 p
(Contract F30602-79-C-0002; AF Proj. 4506)
(AD-A113254; HAC-W-08193; RADC-TR-82-4) Avail: NTIS HC A03/MF A01 CSCL 09/1

The objective of the MULTIMODE AMPLIFIER program was to perform a feasibility study aimed at the development of a dual power coupled cavity TWT. The characteristics of interest in this device are 100 kW peak power, 10% duty and 500 MHz bandwidth in the primary mode of operation. The secondary mode will have a peak power of 500 kW, bandwidth of 250 MHz and a duty of 10%. This report describes the design details of the high power, dual mode S-band TWT and presents performance data from an experimental model, which was constructed to demonstrate some of the design features of the final amplifier.
Author (GRA)

N82-28558# IBM Federal Systems Div., Manassas, Va.
ELECTRICAL CHARACTERIZATION OF 64K DYNAMIC RAMS Final Technical Report, Jan. 1980 - Sep. 1981
G. Manzo, P. Pfeiffer, and T. Cowell Griffiss AFB, N.Y. RADC Jan. 1982 121 p
(Contract F30602-80-C-0045; AF Proj. 2338)
(AD-A113190; RADC-TR-81-373) Avail: NTIS HC A06/MF A01 CSCL 09/2

Electrical characterizations were performed on 64K dynamic RAMs available from the merchant semiconductor industry. Based on the data obtained, parameter limits were established and proposed for the draft MIL-M-38510/244 specification. The data, proposed limits, and related discussion are presented. The objective of this program was to electrically characterize a representative sample of 64K Dynamic RAMs to establish their performance in a military environment. Based on this characterization, performance limits were to be established and incorporated into a draft MIL-M-38510 detail specification. IBM's approach to this task was extremely comprehensive, and because of their close working relationship with merchant vendors, they were able to select and characterize those devices which have the highest probability of becoming military qualified products. As this report indicates, their characterization was very thorough, and the draft specification (M38510/244) which resulted was comprehensive, of a high quality and was ready for coordination.
Author (GRA)

N82-28559# Defence Research Establishment Valcartier (Quebec).
COMPUTER-AIDED DESIGN AND FABRICATION OF WIRE-WRAP (TRADEMARK) TYPE CIRCUIT BOARDS: A NEW SYMBOLISM AND ITS IMPLEMENTATION
B. Montminy, R. Carbonneau, A. LaFlamme, M. Lessard, and A. Blanchard Feb. 1982 91 p refs
(AD-A113439; DREV-R-4245/82) Avail: NTIS HC A05/MF A01 CSCL 09/5

We define here an encoding symbolism that permits, with a minimum of statements, a thorough description of the numerous interconnections of complex electronic circuitry. This symbolism has been integrated at the Defence Research Establishment Valcartier in a computer-aided method that considerably eases the passage between an engineering electronic schematic and the related interconnection matrix required for Wire-Wrap (Trademark) hardware. Electronics prototyping has been dramatically speeded up with this technique because of the time savings in the preparatory reduction of interconnection data.
Author (GRA)

N82-28560# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE DEVELOPMENT AND APPLICATION OF THE MAGNETRON
Yang Gangyi 31 Mar. 1982 11 p Transl. into ENGLISH of Hangkong Zhishi (China), no. 2, Feb. 1980 p 12-13
(AD-A114155; FTD-ID(RS)T-0141-82) Avail: NTIS HC A02/MF A01 CSCL 09/1

The development of the magnetron is traced historically with particular emphasis on the use of the device in radar systems and microwave heating technology. The use of the magnetron in medicine is also briefly addressed. M.G.

N82-28561# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FUNDAMENTALS OF ELECTRICAL PROPULSION PLANT DESIGN
N. A. Kuznetsov, P. V. Kuropatkin, A. B. Khaykin, and N. M. Khomyakov 6 Apr. 1982 761 p refs Transl. into ENGLISH of "Osnovy Proyektirovaniya Grebnykh Elektricheskikh Ustanovok" Leningrad, Sudostroyeniye, 1972 p 1-656
(AD-A114423; FTD-ID(RS)T-1388-80) Avail: NTIS HC A99/MF A01 CSCL 21/3

Contents: electrical propulsion plant equipment requirements; dc electrical propulsion plant main current circuits; dc electrical propulsion plant field and regulation circuits; dc electrical propulsion plant protection, indication, and blocking circuits; calculation of the static characteristics of dc electrical propulsion plants; electrical propulsion plant stability and control quality; transient processes in dc electrical propulsion plants (theory,

analytical, and graphic-analytical calculation methods); mathematical modelling for analysis and synthesis of electrical propulsion plant transient processes; problems of ac electrical propulsion plant design and their prospective development; transient processes in ac electric propeller drive; geometrical and weight characteristics of electrical propulsion plant main machinery; and dual-current electrical propulsion plants. A.R.H.

N82-28562# Raytheon Co., Bedford, Mass. Missile Systems Div.
TECHNICAL GUIDELINES FOR LSI HYBRID MICROCIRCUITS Interim Report, Sep. 1980 - Aug. 1981
Charles Ross, Joseph A. Ciccio, and R. Rego Dec. 1981 183 p refs
(AD-A114437; BR-13050; DELET-TR-80-0302) Avail: NTIS HC A09/MF A01 CSCL 09/5

This report describes the status of the work done during the initial phase of the contract to develop design and layout rules which can be used as data base for the computer aided interconnection design of digital hybrid microcircuits. A requirement is the use of existing or near term production devices of selected semiconductor technologies that operate at clock rates from 10 to 250 MHz with switching speeds up to 1 GHz.
Author (GRA)

N82-28563# Massachusetts Inst. of Tech., Cambridge.
ADVANCED ELECTRONIC TECHNOLOGY Quarterly Technical Summary Report, 1 Aug. - 31 Oct. 1981
Alan J. McLaughlin and Alan L. McWhorter 15 Nov. 1981 22 p
(Contract F19628-80-C-0002; AF Proj. 649L)
(AD-A114319; ESD-TR-81-330) Avail: NTIS HC A02/MF A01 CSCL 09/5

Contents: Data Systems - Division 2 -- Digital Integrated Circuits - Group 23 - Introduction, Advanced Circuit Design and Simulation, Restructurable VLSI Technology, Semiconductor Processing, Device Theory; Computer Systems - Group 28; Solid State - Division 8 -- Division 8 Reports on Advanced Electronic Technology - Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, Analog Device Technology. GRA

N82-28564# Litek International, Inc., Hayward, Calif.
ELECTRODELESS FLUORESCENT LAMP Final Report
Oct. 1981 24 p Prepared in cooperation with California Univ., Berkeley, Lawrence Berkeley Lab.
(Contract W-7405-eng-48)
(DE82-005147; LBL-13480) Avail: NTIS HC A02/MF A01

The development, testing, and delivery of ten prototype energy efficient light bulbs are described. The Litek lamps, delivered to LBL on September 30, 1981, were electrodeless fluorescent light bulbs which employ a solid state radio frequency electronic driver to excite a mercury vapor gas discharge which in turn excites a conventional fluorescent phosphor layer to produce visible light. The marketing research plan, including prior marketing research efforts, is discussed. DOE

N82-28565# Ames Lab., Iowa.
PROCESSING AND PROPERTIES OF ZnO BASED VARISTORS M.S. Thesis
Elizebetta Orlandoni deBracho Oct. 1981 134 p refs
(Contract W-7405-eng-82)
(DE82-005583; IS-T-966) Avail: NTIS HC A07/MF A01

The influence of sintering temperature and additive content on the electrical characteristics and microstructure of ZnO based varistors with Bi2O3 (always present), Sb2O3, Co3O4, MnO2 and Cr2O3 as additive oxides is studied. The influence of sintering temperature and additive content on the electrical characteristics of ZnO based varistors without Bi2O3, but with additives from the rare earth oxide series such as Eu2O3, La2O3, Pr6O11 and Ho2O3, is also studied. DOE

N82-28566# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
MEASUREMENT AND USE OF THE PLASMA CURRENT WAVEFORM IN AN RF SILANE DISCHARGE
Earl R. Mosburg, Jr., Ralph Kerns, and John Abelson Dec. 1981 5 p Presented at the Third Symp. on Plasma Processing, 12-16 Oct. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-005119; SERI/TP-212-1469) Avail: NTIS HC A02/MF A01

The waveform of the incremental current due to the presence of the plasma was measured by incorporating a silane discharge into an RF bridge circuit. Accuate measurements of the power dissipation in the plasma were made. The current waveform has a large harmonic content which must be generated in the nonlinear regions of the plasma near the discharge boundaries. Since it is just these regions which are most important in determining the character of the deposited Si layers, the current waveform can be used as a sensitive tool for monitoring the reproducibility of discharge conditions in different runs. DOE

N82-28567# Sandia Labs., Albuquerque, N. Mex. GeoEnergy Instrumentation Div.
SOURCEBOOK ON HIGH-TEMPERATURE ELECTRONICS AND INSTRUMENTATION
Anthony F. Veneruso, ed. Oct. 1981 229 p refs
(Contract DE-AC04-76DP-00789)
(DE82-006197; SAND-81-2112) Avail: NTIS HC A11/MF A01

The high-temperature characteristics of a number of commercially available electronic components and materials required in geothermal well-logging instruments that must operate to 2750 C are summarized. The high-temperature electronic products that are available and the design and performance limitations of these products are discussed. The electronic component information given includes the standard repertoire of passive devices such as resistors, capacitors, and magnetics; the active devices and integrated circuits sections emphasize silicon semiconductor JFETs and CMOS circuits; and, to complete the electronics, interconnections and packaging of hybrid microelectronics are described. Thermal insulation and refrigeration alternatives are also presented. Finally, instrument housing materials and high-temperature cables and cablehead connectors are listed.
DOE

N82-28568# Chicago Univ., Ill.
ENGINEERING DEVELOPMENT STUDIES FOR INTEGRATED EVACUATED CPC ARRAYS Interim Technical Progress Report
R. Winston and Joseph J. OGallagher 30 Sep. 1981 27 p refs
(Contract DE-AC04-81AL-16223)
(DE82-005376; DOE/AL-16223/1) Avail: NTIS HC A03/MF A01

A substantial improvement in optical efficiency over contemporary external reflector evacuated tube collectors was achieved by integrating the reflector surface into the outer glass envelope. The design, fabrication and preliminary test results are described for a prototype collector based on this concept. Efficiencies above 40% up to nearly 300 C may be achieved. A comprehensive test program to measure performance and operational characteristics of a 2 sq m panel (45 tubes) is being carried out and problems associated with the deployment and application of larger arrays are being studied. DOE

N82-28569# Argonne National Lab., Ill. Chemical Engineering Div.
SOLID-STATE HIGH COMMON-MODE BATTERY CELL VOLTAGE SCANNER: DESIGN REPORT
C. A. Swoboda, P. H. Cannon (Science Applications, Inc., Oak Brook, Ill.), F. Hornstra, R. J. Kmiec, and N. P. Yao Nov. 1981 38 p
(Contract W-31-109-eng-38)
(DE82-007032; ANL/OEPM-81-7) Avail: NTIS HC A03/MF A01

The characterization or testing of full-size electric-vehicle batteries using a computerized data acquisition system (DAS) poses three major problems. The first problem is one of discrimination. Common-mode voltages approaching 300 V are routinely encountered and must be safety rejected by the DAS while it is accurately recording individual cell voltaes, which are low in comparison to common-mode voltages. The second problem involves reduction of the data collected, and the third concerns protection of the battery under test. The continuous-scan

solid-state instrument addresses these problems. The microprocessor-based instrument, which is interfaced to a computer automated measurement and control (CAMAC) system, has the ability to reject common-mode voltages of up to 300 V. It incorporates data-reduction algorithms to minimize the amount of data passed to a central computer through the CAMAC system. This data-reduction feature also simplifies statistical cell studies by providing minimum and maximum cell voltages, identification of cells producing the minimum and maximum voltages, and the average and the standard deviation of the cell voltages. The instrument provides battery system protection by comparing the individual cell voltages to preset minimum and maximum limits and signaling any deviations. The scanner can be programmed to signal any cell voltage irregularity or to automatically terminate the testing should deviations occur. DOE

N82-28570# Sandia Labs., Albuquerque, N. Mex.
STABILITY OF A 100-kV SELF-FIRING SPARK GAP
M. T. Buttram Oct. 1981 41 p refs
(Contract DE-AC04-76DP-00789)
(DE82-005718; SAND-81-1552) Avail: NTIS HC A03/MF A01

The stability of the self breakdown voltage of a sulfur hexafluoride insulated spark gap with graphite, elkonite, aluminum, and brass electrodes was examined for samples of several thousand pulses at repetition rates ranging from a fraction of a Hertz to 2 Hz. The switch was resistively charged with a time constant of approximately 0.3 s. The breakdown voltage for each shot as recorded with an on-line data acquisition system. Histograms of the data show that the switching voltage can be sufficiently stable that the bulk of the firings occur in a 3 to 6 kV range at a 90 kV mean breakdown voltage, yet some firings inevitably occur down to 60% of the mean breakdown voltage level. This stable operation is typical of graphite and elkonite from the initial firings but was only obtained after aging (conditioning) with brass and aluminum electrodes. It is speculated that the aging process which can be reversed by a few minutes without pulsing may be a surface chemistry effect although other options are mentioned. DOE

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics*.

N82-28571# Aeronautical Research Inst. of Sweden, Stockholm.
MEASURING THE FLOW PROPERTIES OF SLOTTED TEST-SECTION WALLS
Sune B. Berndt May 1982 15 p refs
(FFA-135) Avail: NTIS HC A02/MF A01

By measuring pressure distributions at two levels near a slotted wall it is possible to deduce simultaneous values of normal and longitudinal velocities. Such measurements require, for their proper interpretation, a basic understanding of the flow in the neighborhood of the wall. An analysis of the problems involved is provided. Author

N82-28572*# Stanford Univ., Calif. Joint Inst. for Aeronautics and Acoustics.
A GENERAL METHOD TO DETERMINE THE STABILITY OF COMPRESSIBLE FLOWS
Rolf Adolf Guenther and I-Dee Chang May 1982 132 p refs
(Contract NCC2-55)
(NASA-CR-169129; NAS 1.26:169129; SU-JIAA-TR-34) Avail: NTIS HC A07/MF A01 CSCL 20D

Several problems were studied using two completely different approaches. The initial method was to use the standard linearized perturbation theory by finding the value of the individual small disturbance quantities based on the equations of motion. These were serially eliminated from the equations of motion to derive a single equation that governs the stability of fluid dynamic system. These equations could not be reduced unless the steady state variable depends only on one coordinate. The stability equation based on one dependent variable was found and was examined to determine the stability of a compressible swirling jet. The second method applied a Lagrangian approach to the problem. Since the equations developed were based on different assumptions, the condition of stability was compared only for the Rayleigh problem of a swirling flow, both examples reduce to the Rayleigh criterion. This technique allows including the viscous shear terms which is not possible in the first method. The same problem was then examined to see what effect shear has on stability. A.R.H.

N82-28573*# Systems and Applied Sciences Corp., Hampton, Va.
FINITE-DIFFERENCE SOLUTION OF THE COMPRESSIBLE STABILITY EIGENVALUE PROBLEM Final Report
Mujeeb R. Malik Washington NASA Jun. 1982 50 p refs
(Contract NAS1-16572)
(NASA-CR-3584; NAS 1.26:3584) Avail: NTIS HC A03/MF A01 CSCL 20D

A compressible stability analysis computer code is developed. The code uses a matrix finite difference method for local eigenvalue solution when a good guess for the eigenvalue is available and is significantly more computationally efficient than the commonly used initial value approach. The local eigenvalue search procedure also results in eigenfunctions and, at little extra work, group velocities. A globally convergent eigenvalue procedure is also developed which may be used when no guess for the eigenvalue is available. The global problem is formulated in such a way that no unstable spurious modes appear so that the method is suitable for use in a black box stability code. Sample stability calculations are presented for the boundary layer profiles of a Laminar Flow Control (LFC) swept wing. Author

N82-28574*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE DRYOUT REGION IN FRICTIONALLY HEATED SLIDING CONTACTS
R. C. Hendricks, J. Braun (Akron Univ., Ohio), V. Arp, and P. J. Giarratano (NBS, Boulder, Colo.) 1982 20 p refs Proposed for presentation at the Intern. Heat Transfer Conf., Munich, 6-10 Sep. 1982; sponsored by the Am. Soc. of Mech. Engr.
(NASA-TM-82796) Avail: NTIS HC A02/MF A01 CSCL 13I

Some conditions under which boiling and two-phase flow can occur in or near a wet sliding contact are determined and illustrated. The experimental apparatus consisted of a tool pressed against an instrumented slider plate and motion picture sequences at 4000 frames/sec. The temperature and photographic data demonstrated surface conditions of boiling, drying, trapped gas evolution (solutions), and volatility of fluid mixture components. The theoretical modeling and analysis are in reasonable agreement with experimental data. Author

N82-28575*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRELIMINARY ANALYSIS OF STS-3 ENTRY HEAT-TRANSFER DATA FOR ORBITER WINDWARD CENTERLINE
David A. Throckmorton, H. Harris Hamilton, II, and E. Vincent Zoby Jun. 1982 48 p refs
(NASA-TM-84500; NAS 1.15:84500) Avail: NTIS HC A03/MF A01 CSCL 20D

A preliminary analysis of heat transfer data on the space shuttle orbiter windward centerline for the STS-3 mission entry is presented. Temperature-time history plots for each measurement location and tabulated wall temperature and convective heating rate data at 21 selected trajectory points are included. The STS-3 flight data are also compared with predictions by two approximation methods for computing convective heat transfer rates in equilibrium air. J.D.

N82-28576*# Cooper Union, New York.
A COMPREHENSIVE MODEL TO DETERMINE THE EFFECTS OF TEMPERATURE AND SPECIES FLUCTUATIONS ON REACTION RATES IN TURBULENT REACTING FLOWS Semiannual Status Report, 1 Feb. - 31 Jul. 1982
W. Chinitz, E. Foy, G. Rowan, and D. Goldstein 31 Jul. 1982 64 p refs

(Grant NAG1-18)
(NASA-CR-169124; NAS 1.26:169124) Avail: NTIS HC A04/MF A01 CSCL 20D

The use of probability theory to determine the effects of turbulent fluctuations on reaction rates in turbulent combustion systems is briefly reviewed. Results are presented for the effect of species fluctuations in particular. It is found that turbulent fluctuations of species act to reduce the reaction rates, in contrast with the temperature fluctuations previously determined to increase Arrhenius reaction rate constants. For the temperature fluctuations, a criterion is set forth for determining if, in a given region of a turbulent flow field, the temperature can be expected to exhibit ramp like fluctuations. Using the above results, along with results previously obtained, a model is described for testing the effects of turbulent fluctuations of temperature and species on reaction rates in computer programs dealing with turbulent reacting flows. An alternative model which employs three variable probability density functions (temperature and two species) and is currently being formulated is discussed as well. Author

N82-28577*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NUMERICAL SIMULATION OF WALL-BOUNDED TURBULENT SHEAR FLOWS
Parviz Moin Jun. 1982 25 p refs Presented at 8th Intern. Conf. on Numerical Methods in Fluid Dyn., Aachen, 28 Jun. - 2 Jul. 1982
(NASA-TM-84259; A-8902; NAS 1.15:84259) Avail: NTIS HC A02/MF A01 CSCL 20D

Developments in three dimensional, time dependent numerical simulation of turbulent flows bounded by a wall are reviewed. Both direct and large eddy simulation techniques are considered within the same computational framework. The computational spatial grid requirements as dictated by the known structure of turbulent boundary layers are presented. The numerical methods currently in use are reviewed and some of the features of these algorithms, including spatial differencing and accuracy, time advancement, and data management are discussed. A selection of the results of the recent calculations of turbulent channel flow, including the effects of system rotation and transpiration on the flow are included. Author

N82-28578*# Rockwell International Corp., Downey, Calif.
TESTING OF A HIGH CAPACITY RESEARCH HEAT PIPE Final Report
May 1982 74 p refs
(Contract NAS9-16399)
(NASA-CR-167625; NAS 1.26:167625) Avail: NTIS HC A04/MF A01 CSCL 20D

Tests were performed on a high-capacity channel-wick heat pipe to assess the transport limitations of v-grooves and the effects of boiling. The results showed that transport can vary significantly (less than 50 W) under similar conditions and the continuous boiling was observed at power levels as low as 40 W. In addition, some evidence was found to support the predictions using a groove transport model which shows that transport increases with lower groove densities and longer evaporators. However, due to transport variations, these results were not consistent throughout the program. When a glass fiber wick was installed over the grooves, a relatively low transport level was achieved (80 to 140 W). Based on these results and the identification of some potential causes for them, several design suggestions were recommended for reducing the possibility of boiling and improving groove transport. Author

N82-28579*# Oklahoma State Univ., Stillwater. School of Mechanical and Aerospace Engineering.
STUDY OF BOUNDARY-LAYER TRANSITION USING TRANSONIC CONE PRESTON TUBE DATA Final Report
T. D. Reed and A. Abu-Mostafa Jul. 1982 127 p refs
(Grant NSF-2396)
(NASA-CR-169130; NAS 1.26:169130) Avail: NTIS HC A07/MF A01 CSCL 20D

Laminar layer Preston tube data on a sharp nose, ten degree cone obtained in the Ames 11 ft TWT and in flight tests are analyzed. During analyses of the laminar-boundary layer data, errors were discovered in both the wind tunnel and the flight data. A correction procedure for errors in the flight data is recommended which forces the flight data to exhibit some of the orderly characteristics of the wind tunnel data. From corrected wind tunnel data, a correlation is developed between Preston tube pressures and the corresponding values of theoretical laminar skin friction. Because of the uncertainty in correcting the flight data, a correlation for the unmodified data is developed, and, in addition, three other correlations are developed based on different correction procedures. Each of these correlations are used in conjunction with the wind tunnel correlation to define effective freestream unit Reynolds numbers for the 11 ft TWT over a Mach number range of 0.30 to 0.95. The maximum effective Reynolds numbers are approximately 6.5% higher than the normal values. These maximum values occur between freestream Mach numbers of 0.60 and 0.80. Smaller values are found outside this Mach number range. These results indicate wind tunnel noise affects the average laminar skin friction much less than it affects boundary layer transition. Data on the onset, extent, and end of boundary layer transition are summarized. Application of a procedure for studying the relative effects of varying nose radius on a ten degree cone at supercritical speeds indicates that increasing nose radius promotes boundary layer transition and separation of laminar boundary layers. J.D.

N82-28580# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
ENTRAINMENT MODELLING OF BUOYANT MOMENTUM JETS IN WATER M.S. Thesis
David Stuart Hilder Dec. 1981 131 p refs
(Contract N00024-81-WR-10497)
(AD-A112797; NPS69-81-006) Avail: NTIS HC A07/MF A01 CSCL 12/1

The general characteristics of buoyant momentum jets in water are described. Previous analytical modelling techniques utilizing the entrainment concept for prediction of trajectory and residual physical properties are discussed, and an overview of the existing experimental data base is given. The limitations of previous analytical modelling techniques are enumerated, generally resulting from incomplete or inadequate equations of state. An existing comprehensive equation of state for pure and saline water is proposed for use in entrainment modelling. An original computerized procedure, based on appropriate conservation equations, is used to predict trajectory and physical properties of various buoyant momentum jets. Comparison is made with previous analytical and experimental results for the cases of quiescent, flowing, and stratified ambients. Finally, the comprehensive equation of state, coupled with the present computational procedure, is used to describe a complexly stratified ambient and the behavior of a buoyant momentum jet discharged into it. Author (GRA)

N82-28581# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
WALL LAYER STRUCTURE AND DRAG REDUCTION: ROLE OF VICOUS SUBLAYER Technical Report, 2 Jan. - 31 Jan. 1981
William G. Tiederman and David G. Bogard Dec. 1981 41 p refs
(Contract N00014-81-K-0210; SR0230101)
(AD-A112980; PME-FM-81-2) Avail: NTIS HC A03/MF A01 CSCL 20/4

The basic objective of this experimental study was to determine if the presence of a drag-reducing polymer solution in only the viscous subla,er of a turbulent channel flow of water can inhibit the formation of low-speed streaks, and thereby reduce both the production of turbulent kinetic energy and the wall shear stress. The experiments were performed in a long water channel with a 2.5 x 25 cm rectangular cross section. Drag-reducing polymer solutions, glycerin solutions (whose viscosity matched those of the polymer solutions) and water were seeped into the viscous sublayer of the fully developed, turbulent channel flow through thin slots in both of the 25 cm walls. Flow visualization conducted immediately downstream of the slot (before the injected fluid could migrate out of the sublayer) showed that the dimensionless spanwise spacing was the same for all injected fluids. Similarly pressure drop measurements showed that drag reduction occurred only after a portion of the polymer solutions had migrated out of the viscous sublayer. These results indicate that the drag-reducing molecules have a direct

effect on the flow structures in the buffer region of turbulent wall flows. Author (GRA)

N82-28582# Massachusetts Inst. of Tech., Cambridge. Fluid Mechanics Lab.

MEASUREMENT METHODS FOR FLUID SHEAR STRESS Annual Summary Report, 1 Jan. - 31 Dec. 1980

C. Forbes Dewey and Peter W. Huber Mar. 1982 80 p refs
(Contract N00014-80-C-0109; NR Proj. 097-441)
(AD-A113020; Rept-82-4) Avail: NTIS HC A05/MF A01 CSCL 20/4

Fluid shear stress is one of the most important quantities characterizing the interaction between a flowing fluid and a solid body. A knowledge of surface shear stress is essential in determining the drag on submerged bodies, the energy losses in internal flows, local surface heat transfer rates in both internal and external flows, flow separation, cavitation, and unsteady flow behavior in rotating machinery. Author (GRA)

N82-28583# DCW Industries, Studio City, Calif.

NUMERICAL ALGORITHM FOR RAPID INTEGRATION OF TURBULENCE-MODEL EQUATIONS ON ELLIPTIC REGIONS Final Scientific Report, 1 Mar. 1978 - 31 Dec. 1981

David C. Wilcox Feb. 1982 33 p refs
(Contract F49620-78-C-0024; AF Proj. 2307)
(AD-A113013; DCW-R-21-04; AFOSR-82-0213TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

A numerical algorithm suitable for rapid numerical solution of advanced turbulence-model equations on elliptic regions has been devised. The algorithm is particularly useful for obtaining accurate solutions when (1) one of the dependent variables is singular approaching a solid boundary, and (2) the number of mesh points available to resolve the flowfield is small. The new algorithm is used in conjunction with the MacCormack semi-implicit scheme for solving the time-averaged Navier-Stokes equations to obtain solutions for a laminar Mach 2 boundary layer and for a turbulent Mach 3 boundary layer. In both cases, numerical accuracy is shown to be excellent for meshes having less than 20 points normal to the surfaces. As a corollary result of this study we have shown that, using the new algorithm and the MacCormack scheme, time-averaged Navier-Stokes solutions are now feasible using a microcomputer. Author (GRA)

N82-28584# Scientific Research Associates, Inc., Glastonbury, Conn.

COMPUTATION OF TURBULENT HORSESHOE VORTEX FLOW PAST SWEPT AND UNSWEPT LEADING EDGES Final Report, Jan. 1980 - 31 Dec. 1981

W. R. Briley and H. McDonald Mar. 1982 55 p refs
(Contract N00014-77-C-0075)
(AD-A113534; SRA-R82-920001-F) Avail: NTIS HC A04/MF A01 CSCL 20/4

Three dimensional turbulent horseshoe vortex flow past strut/endwall configurations having both unswept and 45-degree swept leading edges is studied by numerical solution of the compressible Reynolds-averaged Navier-Stokes equations. The Cartesian form of the equations is transformed to a general nonorthogonal coordinate system which is fitted to the geometry of interest and then solved using a consistently-split linearized block implicit (LBI) algorithm. The turbulence model and computational mesh provides for resolution of the viscous sublayer and employs an isotropic eddy viscosity based on solution of the turbulence kinetic energy equation and a specified length scale. Although no flow measurements are available for the region near the leading edge, predictions of the horseshoe vortex formation near the leading edge are in qualitative agreement with flow visualization studies of similar flows. Predictions of the relatively weak secondary flow in the corner region well downstream of the unswept leading edge do not agree with available measurements, and this is believed to be the result of numerical truncation error and/or inadequacy of the turbulence model. Author (GRA)

N82-28585# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).

AN EXPERIMENTAL AND NUMERICAL STUDY OF AN AIR-TO-AIR HEAT EXCHANGER USING LIQUID RESERVOIR VARIABLE CONDUCTANCE HEAT PIPES Final Scientific Report, 1 Feb. 1981 - 31 Jan. 1982

S. Drouilhet and J-M. Buchlin 1982 97 p refs
(Grant AF-AFOSR-120-81; AF Proj. 2301)
(AD-A113354; EOARD-TR-82-9) Avail: NTIS HC A05/MF A01 CSCL 13/1

This report documents a study of a prototype air-to-air heat exchanger of which the thermal conductivity is governed by the reservoir temperature of the heat pipes. The work is introduced with a brief review of the basic operating principles of heat pipes and of the various existing schemes for variable conductance. An experimental facility, incorporating a computerized data acquisition system, was developed to investigate the steady state performance characteristics of the heat exchanger over a wide range of air inlet temperatures, mass flow rates, and reservoir temperatures. Some tests were conducted imposing a single operating temperature on all of the heat pipes, while in others the heat pipe rows were allowed to operate independently. The results are expressed in terms of heat exchanger effectiveness versus normalized reservoir temperature for various values of the ratio of the mass flow rates of the air streams. Conclusions are drawn as to the internal behaviour of this type of heat pipes under various operating regimes. An original computer model is presented which combines quasi analytical solution for the air and fin temperature profiles in the heat exchanger with a heat pipe simulation routine based on the hydrodynamic equations involved in the working fluid cycle. Computational results are are shown, and a brief comparison with the experiments is made. Possible modifications that would improve the accuracy and the versatility of the program are discussed. GRA

N82-28586# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).

A NUMERICAL INVESTIGATION OF THE DYNAMICS OF LIQUID SPRAY Final Scientific Report, 1 Feb. 1981 - 31 Jan. 1982

Paul Weinacht and J-M. Buchlin Mar. 1982 89 p refs
(Grant AF-AFOSR-0117-81; AF Proj. 2301)
(AD-A113378; EOARD-TR-82-6) Avail: NTIS HC A05/MF A01 CSCL 20/4

An axisymmetric numerical model of a liquid spray is presented. The model consists of coupled sets of partial differential equations for the gas phase and ordinary differential equations for the liquid phase. A numerical method based on the MAC method is presented and calculations show good agreement with experiment. The effect of a ceiling on the entrainment performance of a spray is found to be negligible. The examination of the calculated pressure field shows that pressure does not play an important role in the flow and may be ignored. This is in agreement with experiment and contributes additional validation to existing models which ignore this effect. Author (GRA)

N82-28587# Pennsylvania State Univ., University Park. Applied Research Lab.

AN EXPERIMENTAL STUDY OF TRAVELLING-BUBBLE CAVITATION NOISE

M. F. Hamilton, D. E. Thompson, and M. L. Billet 4 Dec. 1981 46 p refs
(Contract N00024-79-C-6043)
(AD-A114107; ARL/PSU/TM-81-245) Avail: NTIS HC A03/MF A01 CSCL 20/1

In this investigation, high-frequency travelling-bubble cavitation noise generated on a Schiebe headform is analyzed with regard to noise theories which are based on the collapse of a single bubble. After normalizing the noise level by an event rate, -sigma C(p(min)) appears to provide a reasonable scaling factor for the noise level radiated per collapse, where sigma is the cavitation number and C(p(min)) is the minimum pressure coefficient on the headform. At frequencies above 10 kHz and free-stream flow velocities between 9.1 and 12.2 mps (30 and 40 fps), the noise level per collapse varied as roughly 1/sigma to the 8.4 power, and was constant with the flow velocity for constant -sigma/C(p(min)). The energy density spectra were flat from 10 to 100 kHz regardless of the cavitation number or free-stream velocity. Author (GRA)

N82-28588# Physical Sciences, Inc., Woburn, Mass.

STUDY OF TURBULENT BOUNDARY LAYERS OVER ROUGH SURFACES WITH EMPHASIS N THE EFFECTS OF

ROUGHNESS CHARACTER AND MACH NUMBER Annual Report, 1 Nov. 1980 - 30 Sep. 1981
M. L. Finson Feb. 1982 73 p refs
(Contract F49620-80-C-0015; AF Proj. 2307)
(AD-A114217; PSI-TR-312; AFOSR-82-0367TR) Avail: NTIS HC A04/MF A01 CSCL 20/4

A Reynolds stress model for turbulent boundary layers on rough walls is used to investigate the effects of roughness character and compressibility. The flow around roughness elements is treated as form drag. A method is presented for deriving the required roughness shape and spacing from profilometer surface measurements. Calculations based on the model compare satisfactorily with low speed data on roughness character and hypersonic measurements with grit roughness. The computer model is exercised systematically over a wide range of parameters to derive a practical scaling law for the equivalent roughness. In contrast to previous correlations, for most roughness element shapes the effective roughness is not predicted to show a pronounced maximum as the element spacing decreases. The effect of roughness tends to be reduced with increasing edge Mach number, primarily due to decreasing density in the vicinity of the roughness elements. It is further shown that the required roughness Reynolds number for fully rough behavior increases with increasing Mach number, explaining the small roughness effects observed in some hypersonic tests. Author (GRA)

N82-28589# Scientific Research Associates, Inc., Glastonbury, Conn.
COMPUTATION OF LAMINAR AND TURBULENT FLOW IN 90 DEG SQUARE DUCT AND PIPE BENDS USING THE NAVIER-STOKES EQUATIONS Final Report, 1 Mar. 1981 - 28 Feb. 1982
W. R. Briley, R. C. Buggein, and H. McDonald Apr. 1982 68 p refs
(Contract N00014-81-C-0377)
(AD-A114258; SRA-R82-920009-F) Avail: NTIS HC A04/MF A01 CSCL 20/4

Three dimensional laminar and turbulent flow within 90-degree bends of strong curvature and both circular and square cross section are studied by numerical solution of the compressible Reynolds-averaged Navier-Stokes equations. The governing equations are expressed in a body-fitted orthogonal coordinate system and then solved using a consistently-split linearized block implicit (LBI) algorithm. The turbulence model and computational mesh provides for resolution of the viscous sublayer and employs an isotropic eddy viscosity based on solution of the turbulence kinetic energy equation and a specified length scale. Six different flow cases are considered, and the developing flow structure and its dependence on geometric and flow parameters is examined. The computed results are compared with available experimental measurements, and the sequence of comparisons helps to establish the accuracy with which these flows can be predicted by the present method using moderately coarse grids (approx = 10,000 points). Author (GRA)

N82-28590# Woods Hole Oceanographic Institution, Mass.
THE 1981 SUMMER STUDY PROGRAM IN GEOPHYSICAL FLUID DYNAMICS AT THE WOODS HOLE OCEANOGRAPHIC INSTITUTION PHYSICS OF CONVECTION
Willem V. R. Malkus and Florence K. Mellor, ed. Nov. 1981 302 p refs
(Grant N00014-81-G-0089)
(AD-A114366; WHOI-81-102) Avail: NTIS HC A14/MF A01 CSCL 20/4

Convection and its various transistions to chaotic behavior were discussed. Convection in the ocean, the atmosphere, the Earth's core and mantle, and in the Sun was discussed. R.J.F.

N82-28591# California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.
RESEARCH ON AUGMENTATION OF TURBULENT MIXING Final Report, 1 Mar. 1980 - 28 Feb. 1982
Anatol Roshko 5 May 1982 6 p refs
(Contract N00014-79-C-0365)
(AD-A114310) Avail: NTIS HC A02/MF A01 CSCL 20/4

The research problems studied under this contract may be grouped into the following broad categories: (1) Description of the mechanics of mixing in turbulent shear layers and the role of the large and small structure in these processes; (2) Investigation of methods for modifying and enhancing the mixing; (3) Development of experimental methods and instrumentation to facilitate the above; and (4) Theoretical interpretations and models of the experimental results. GRA

N82-28592# Naval Research Lab., Washington, D. C.
ACOUSTIC INSTABILITIES AS A SOURCE OF TURBULENCE IN REDUCED DENSITY CHANNELS Interim Report
M. Raleigh 21 Apr. 1982 18 p refs
(ARPA Order 4395; RR0110941)
(AD-A114275; NRL-MR-4781) Avail: NTIS HC A02/MF A01 CSCL 20/4

This document derives the initial growth rate for an acoustic instability in gas relaxing from a nonequilibrium distribution of energy among its internal degress of freedom. The theory is then applied to laser-heated, reduced density channels. These channels are formed in nitrogen, by a focused laser pulse. The excess vibrational energy which is frozen in when the channels expand is shown to be insufficient to account for the observed development of turbulence inside the channels. As energy principle analysis shoes the channels are stable to small disturbances, despite the gas having a temperature dependent specific heat, if the gas remains in thermal equilibrium. Author (GRA)

N82-28593# Naval Ship Research and Development Center, Annapolis, Md. Propulsion and Auxiliary Systems Dept.
PERFORMANCE PREDICTIONS FOR A ROOM TEMPERATURE, ERICSSON CYCLE, MAGNETIC HEAT PUMP
John G. Purnell May 1982 92 p refs
(ZF61512001)
(AD-A114348; DTNSRDC/PAS-82/11) Avail: NTIS HC A05/MF A01 CSCL 13/1

The performance potential of a room temperature magnetic heat pump utilizing Gadolinium and operating on an Ericsson Cycle was investigated at magnetic flux densities of 2 and 7-Tesla which represent the upper limits of conventional and superconducting electromagnetics, respectively. At a coefficient of performance of 5, a 7-Tesla system would provide a cooling capacity of at best 1200 BTU per hour per pound of Gadolinium while a 2-Tesla system would operate at approximately 130 BTU per hour per pound of Gadolinium. Magnetic circuit efficiency was not determined but must be high (95-percent or better) in order for the magnetic heat pump performance to compete with conventional cooling systems. It is unlikely the magnetic heat pump investigated could approach the performance and compactness of the conventional cooling systems unless field strengths much greater than 7-Tesla are possible. Author (GRA)

N82-28594# California Univ., Livermore. Lawrence Livermore Lab.
SOLVING THE NAVIER-STOKES EQUATIONS WITH LSODI AND THE METHOD OF LINES
J. F. Painter 2 Dec. 1981 31 p refs
(Contract W-7405-eng-48)
(DE82-006179; UCID-19262) Avail: NTIS HC A03/MF A01

LSODI is a general-purpose solver for implicitly defined ordinary differential equations and differential-algebraic equations. To test LSODI the incompressible Navier-Stokes equations in two dimensions were chosen, with the space variables discretized by finite differences. LSODI were then used to solve these equations for a problem in which a square cavity is driven by a prescribed velocity at one edge. Solving versions of this problem in several ways, and failing to solve it in other ways, told much about what LSODI can do and how to use it. DOE

N82-28595# Calspan Advanced Technology Center, Buffalo, N.Y. Aerodynamic Research Dept.
PROJECT VULCAN: THE DEVELOPMENT OF A GASDYNAMIC HEATER. VOLUME 2: HEAT TRANSFER AND PERFORMANCE ANALYSES FOR A GASDYNAMIC HEATER WITH HELICAL IMPELLERS
A. L. Russo May 1981 113 p Prepared for Calif. Univ., Lawrence Livermore Lab.
(Contract W-7405-eng-48)
(DE82-006788; CALSPAN-6396-A-1; UCRL-15416-Vol-2) Avail: NTIS HC A06/MF A01

The technical effort during the period from November 1979 to February 1981 on the development of a gasdynamic heater, Project Vulcan, is summarized. The gasdynamic heater is conceptually a simple device. Nevertheless the fabrication of helical lobe configurations requires state-of-the-art technology, and gasdynamic analyses require considerable simplifications and approximations. Accordingly, analyses are presented which provide basic design data, and possible scaling relationships. Most importantly the results confirm the uniqueness of the gasdynamic heater to provide a quasi-steady flow of hot gas for broad metallurgical and physical chemistry applications. The numerical results for heat transfer estimates which are presented were calculated for a helium working fluid with a nominal design point of 4500 K discharge temperature and 2 atm discharge pressure. The models indicate the necessary scaling to other gases. The gasdynamics of the well filling process are examined. The models and estimates for surface heat fluxes are summarized. The heat transfer estimates are used to determine the internal coolant requirements for the heater. The potential performance matrix of the heater is summarized. DOE

N82-28596*# Los Alamos Scientific Lab., N. Mex.
VNAP2: A COMPUTER PROGRAM FOR COMPUTATION OF TWO-DIMENSIONAL, TIME-DEPENDENT, COMPRESSIBLE, TURBULENT FLOW
Michael C. Cline Aug. 1981 208 p refs Sponsored by NASA
(Contract W-7405-eng-36)
(NASA-CR-169103; NAS 1.26:169103; DE82-007360; LA-8872) Avail: NTIS HC A10/MF A01 CSCL 20D

A computer program, VNAP2, for calculating turbulent (as well as laminar and inviscid), steady, and unsteady flow is presented. It solves the two dimensional, time dependent, compressible Navier-Stokes equations. The turbulence is modeled with either an algebraic mixing length model, a one equation model, or the Jones-Launder two equation model. The geometry may be a single or a dual flowing stream. The interior grid points are computed using the unsplit MacCormack scheme. Two options to speed up the calculations for high Reynolds number flows are included. The boundary grid points are computed using a reference plane characteristic scheme with the viscous terms treated as source functions. An explicit artificial viscosity is included for shock computations. The fluid is assumed to be a perfect gas. The flow boundaries may be arbitrary curved solid walls, inflow/outflow boundaries, or free jet envelopes. Typical problems that can be solved concern nozzles, inlets, jet powered afterbodies, airfoils, and free jet expansions. The accuracy and efficiency of the program are shown by calculations of several inviscid and turbulent flows. The program and its use are described completely, and six sample cases and a code listing are included. DOE

N82-28597# Stuttgart Univ. (West Germany). Abteilung Energiewandlung und Waermetechnik.
INVESTIGATION OF THE LONG TERM BEHAVIOR OF HEAT PIPES Ph.D. Thesis [UNTERSUCHUNGEN UEBER DAS LANGZEITBETRIEBSVERHALTEN VON WAERMEROHREN]
Wolf-Dietrich Muenzel Aug. 1981 125 p refs In GERMAN; ENGLISH summary
(IKE-5-215; ISSN-0173-6892) Avail: NTIS HC A06/MF A01

For two typical applications of heat pipes, i. e. spacecraft temperature control and waste heat recovery from industrial processes, some potential working fluid/container material combinations were studied, covering the respective temperature ranges. They were subjected to compatibility tests under heat pipe operating conditions. During these tests, the axial temperature distribution along each of the heat pipes was monitored periodically. From a change in temperature differences versus time at constant test conditions, any long term materials incompatibility are detected. Rising temperatures in the evaporator section due to an increase of the radial thermal resistance results from deposits of solid corrosion products, whereas an increasing temperature drop at the end of the condenser section indicates generation of gaseous corrosion products. Author (ESA)

N82-28598# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
EXPERIMENTAL INVESTIGATION OF THE CIRCULATION AND THE PROPAGATION OF MACROSCOPIC RING VORTICES IN He 2 Thesis - Georg-August-Univ., West Germany [EXPERIMENTELLE UNTERSUCHUNG DER ZIRKULATION UND DER AUSBREITUNG VON MAKROSPISCHEN RINGWIRBELN IN He 2]
Hartwig Borner Nov. 1981 88 p refs In GERMAN; ENGLISH summary
(MPIS-16/1981; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,65

Normal fluid and superfluid vorticity, produced by forcing helium 2 out of a tube 8 mm in inner diameter at velocities of about 10 cm/sec, was investigated in the region in front of the tube orifice. The method of circulation measurement was based on the flow induced variation in the running times of second sound shock waves. The formation of large scale vortex rings, which moved downstream along their axis of symmetry, was observed and measured. Close to the orifice, the normal fluid circulation decreases with decreasing temperature, nearly vanishing at the lowest temperature under consideration, and changes during the translational motion of the vortex rings. Author (ESA)

N82-28599# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
STEADY AND UNSTEADY TRANSONIC FLOW IN A DUCT WITH A SUDDEN ENLARGEMENT
J. S. Anderson and G. E. A. Meier Feb. 1982 73 p refs Sponsored in part by European Science Exchange Program
(MPIS-1/1982; ISSN-0436-1199) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,30

Flow structure in a rectangular or circular duct, following an abrupt change in section, were studied. Density measurement was with a Mach-Zehnder interferometer and of velocity with a laser Doppler anemometer. The flow structure was controlled either by a single normal shock wave or by a series of reflected oblique shocks. In the case of the normal shock wave structure, one-dimensional theory is found to apply adequately to the overall duct. Within the duct, the flow is not one-dimensional, but has a minimum velocity in the center and four shear layers. One-dimensional theory is not successful in explaining the results of the oblique shock wave structure. An empirical approach is adopted to the task of determining the characteristic base pressure oscillation frequency and of estimating the harmonic which occurs. The phase relationship between the pressure downstream at the wall and the base pressure was investigated. It is found that throughout the ducts there is always a phase change of 180 deg between the center and the duct walls. Author (ESA)

N82-28600# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (West Germany). Abt. fuer Aeroelastik.
CALCULATION OF THE UNSTEADY PRESSURE DISTRIBUTION ON AN OSCILLATING CASCADE WITH THICK PROFILES AND STEADY TURNING ANGLE Ph.D. Thesis - Georg-August-Univ., West Germany
Volker Carstens Nov. 1981 83 p refs In GERMAN; ENGLISH summary Report will also be announced as translation (ESA-TT-769)
(DFVLR-FB-81-38) Avail: NTIS HC A05/MF A01; DFVLR, Cologne DM 27,80

A method based on Martensen's theory of vorticity layers on a surface in steady flow is derived to calculate the unsteady pressure distribution on a harmonically oscillating plane cascade with an arbitrary profile shape in incompressible flow. After linearizing the basic equations of the initial boundary value problem, which is generally nonlinear, a Fredholm integral equation is developed for the pressure distribution on oscillating blades. Among other characteristic parameters, this equation describes the interaction of steady and unsteady flow. Pressure distributions and aerodynamic coefficients are given for a special case in order to examine the influence of parameters. Author (ESA)

N82-28601# Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Research Group.
EXPERIMENTAL HEAT TRANSFER COEFFICIENTS FOR

THE COOLING OF OIL IN HORIZONTAL INTERNAL FORCED CONVECTIVE TRANSITIONAL FLOW
D. G. Rogers May 1981 119 p
(PB82-142993; CSIR/CENG-371; ISBN-0-7988-2144-2) Avail: NTIS HC A06/MF A01 CSCL 20D

The heat transfer coefficients for the cooling of a Newtonian oil were determined for the ranges 550 < Re < 2800 and 132 < Pr 642. The Reynolds number alone proved to be an insufficient criterion for the division of transfer regimes, in line with the view of Eckert. In each of three of the transfer regimes rcognized heat transfer ws correlated by a Hausen type equation. The values found for A and B were 0.0184 and 213.9 for the mixed turbulent regime, 0.0277 and 272.5 for the upper transitional regime, 0.0176 and 106.1 for the middle transitional regime. In all these regimes the Stanton number increases with Reynolds number, while in true turbulent or laminar flow it decreases. In the lower transitional regime, characterized by low wall Reynolds numbers, the Stanton number fluctuated with Reynolds number and no good correlation was found. GRA

N82-28602# Institut Francais du Petrole, Rueil-Malmaison.
HEAT PUMP OPERATING WITH A MIXTURE OF FLUIDS Final Report
A. Rojey, C. Meyer, B. Choffe, J. Jacq, L. Asselineau, and J. Vidal 1980 120 p refs Transl. into ENGLISH of French report EUR-6848-FR
(PB82-143611; EUR-6848-FR) Avail: NTIS HC A06/MF A01 CSCL 13A

The coefficient of performance of a heat pump system comprising an external heat exchange medium may be increased if a non-azeotropic mixture of hydrocarbons or freons as working fluid is used so that it vaporizes or condenses with a change in temperature of the external fluid, i.e., the heat exchange medium. The aim of the research project was the selection of suitable mixtures and the investigation of their properties, the study of the operation of a heat pump using such mixtures by means of a mathematical model and experimental tests, as well as by a technico-economic analysis of actual applications in domestic heating systems and in the industrial sector. GRA

N82-28603# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Analysis and Prediction Div.
A METHOD FOR THE CIRCULATION OF INVARIANT MANIFOLDS IN HYDRODYNAMIC STABILITY PROBLEMS Final Report
Robert D. Richtmyer Jul. 1981 42 p refs
(Grant NSF ATM-77-23757)
(PB82-158825; NCAR/TN-176) Avail: NTIS HC A03/MF A01 CSCL 20D

A previous method developed was improved in a number of minor respects, to make possible calculations at Taylor numbers up to about 106, for invariant manifolds up to dimension 14, and to suppress axial flow. The method was programmed for the Cray-1 computer and applied to two series of calculations, one for a narrow gap between cylinders and one for a wide gap. The calculations exhibited the first few bifurcations and the corresponding modes of motion and determined the stability of those modes. No aperiodic motions were found. there is evidence for an additional subcritical bifurcation from the wavy vortex mode at a Taylor number approximately 1.148 x 106 in the wide gap problem. Orbit calculations at 1.15 x 106 failed to find further attractors and indicated an explosive transition to regions of the configuration space beyond the applicability of the present method. Author (GRA)

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N82-28604* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
APPARATUS AND PROCESS FOR MICROBIAL DETECTION AND ENUMERATION Patent
Judd R. Wilkins and David Grana, inventors (to NASA) Issued 15 Jun. 1982 7 p Filed 19 Feb. 1981 Supersedes N81-29727 (19 - 20, p 2811)
(NASA-Case-LAR-12709-1; US-Patent-4,335,206; US-Patent-Appl-SN-235796; US-Patent-Class-435-34; US-Patent-Class-435-39; US-Patent-Class-435-291; US-Patent-Class-204-195B) Avail: US Patent and Trademark Office CSCL 14B

An apparatus and process for detecting and enumerating specific microorganisms from large volume samples containing small numbers of the microorganisms is presented. The large volume samples are filtered through a membrane filter to concentrate the microorganisms. The filter is positioned between two absorbent pads and previously moistened with a growth medium for the microorganisms. A pair of electrodes are disposed against the filter and the pad electrode filter assembly is retained within a petri dish by retainer ring. The cover is positioned on base of petri dish and sealed at the edges by a parafilm seal prior to being electrically connected via connectors to a strip chart recorder for detecting and enumerating the microorganisms collected on filter.
Official Gazette of the U.S. Patent and Trademark Office

N82-28605*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LASER ANEMOMETER USING A FABRY-PEROT INTERFEROMETER FOR MEASURING MEAN VELOCITY AND TURBULENCE INTENSITY ALONG THE OPTICAL AXIS IN TURBOMACHINERY
Richard G. Seasholtz and Louis J. Goldman 1982 11 p refs Proposed for presentation at the Winter Ann. Meeting of the Am. Soc. of Mech. Engr., Phoenix, Ariz., 14-19 Nov. 1982
(NASA-TM-82841; E-1211; NAS 1.15:82841) Avail: NTIS HC A02/MF A01 CSCL 14B

A technique for measuring a small optical axis velocity component in a flow with a large transverse velocity component is presented. Experimental results are given for a subsonic free jet operating in a laboratory environment, and for a 0.508 meter diameter turbine stator cascade. Satisfactory operation of the instrument was demonstrated in the stator cascade facility with an ambient acoustic noise level during operation of about 105 dB. In addition, the turbulence intensity measured with the interferometer was consistent with previous measurements taken with a fringe type laser anemometer. T.M.

N82-28606*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
A FOURIER TRANSFORM SPECTROMETER FOR VISIBLE AND NEAR ULTRA-VIOLET MEASUREMENTS OF ATMOSPHERIC ABSORPTION
C. L. Parsons, J. C. Gerlach, and M. Whitehurst (Joule Corp.) Jun. 1982 23 p refs
(NASA-TM-73297; NAS 1.15:73297) Avail: NTIS HC A02/MF A01 CSCL 14B

The development of a prototype, ground-based, Sun-pointed Michelson interferometric spectrometer is described. Its intended use is to measure the atmospheric amount of various gases which absorb in the near-infrared, visible, and near-ultraviolet portions of the electromagnetic spectrum. Preliminary spectra which contain the alpha, 0.8 micrometer, and rho sigma tau water vapor absorption bands in the near-infrared are presented to indicate the present capability of the system. Ultimately, the spectrometer can be used to explore the feasible applications of Fourier transform spectroscopy in the ultraviolet where grating spectrometers were used exclusively. Author

N82-28607# Naval Research Lab., Washington, D. C. Marine Technology Div.
STRESS ANALYSIS OF TWO MINI-HAT PRESSURE GAGE DESIGNS Final Report, Aug. 1979 - Mar. 1980
V. J. Parks, R. J. Sanford, and L. A. Beaubien 26 Feb. 1982 20 p refs
(DA Proj. 1L1-62618-AH-80)

(AD-A112186; NRL-MR-4780) Avail: NTIS HC A02/MF A01 CSCL 14/2

Two designs of mini-hat pressure gages(G-X and J-1) were stress analyzed with three dimensional photoelasticity and a graphics-oriented, axisymetric finite element method. The results were compared with the exact theoretical solution of a pressurized cone. Both methods showed stresses higher than the theoretical solution in the central portion of the cone, and lower than the theoretical solution at the ends of the conical section. The J-1 gage showed a more linear distribution of the stress, in the conical section, than did the G-X gage. Author (GRA)

N82-28608# BDM Corp., Monterey, Calif.
CALIBRATION AND APPLICATION OF A COMBINATION TEMPERATURE-PNEUMATIC PROBE FOR VELOCITY AND ROTOR LOSS DISTRIBUTION MEASUREMENTS IN A COMPRESSOR
F. Neuhoff Dec. 1981 84 p refs
(Contract N00014-78-C-0204)
(AD-A113834; NPS67-81-03CR) Avail: NTIS HC A05/MF A01 CSCL 14/2

A description is given of the current design of a temperature-pneumatic probe used for radial flow field surveys in an axial compressor. The procedure used to calibrate the probe for variations in Mach number, pitch and yaw angles in a free jet is described and the procedure for representing the characteristics of the probe analytically as three polynomial surfaces, is given. Verification of the calibration in steady flow and application of the probe to obtain radial surveys in a small axial compressor are also described. The procedures developed and reported here allow the probe to be used with automatic reduction of data by mini-computer without the need for iteration. Author (GRA)

N82-28609# California Univ., Berkeley. Dept. of Chemistry.
ENERGY PATHS IN CHEMICAL REACTIONS Final Report, 1 Oct. 1977 - 30 Sep. 1981
George C. Pimentel Feb. 1982 20 p refs
(Grant AF-AFOSR-3535-78)
(AD-A114191; AFOSR-82-0329TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

During the period of the grant, three papers were published connected with the chemical pumping of HF and HCl vibrational lasers. These publications laid the groundwork for our recognition of the role of very high J states in the relaxation processes activated by chemical pumping of high v states. In the first of these the results of measurements of vibrational rate constants for two different chemical laser studies and from a chemiluminescence study were critically compared. Agreement was evident among the different studies (two of them conducted in other laboratories) when reasonable corrections were made for energy transfer corrections. Thus this work attracted attention to near-resonant energy transfer. Author (GRA)

N82-28610# Los Alamos Scientific Lab., N. Mex.
DIGITAL SEQUENTIAL SOLID-STATE RELAY TESTER
Jimmy L. Riley Nov. 1981 10 p refs
(Contract W-7405-eng-36)
(DE82-004680; LA-9008-MS) Avail: NTIS HC A02/MF A01

The design of the digital sequential solid-state relay tester is described. This equipment is used extensively in simplifying the testing and development of the computer-controlled, motor-driven valve array in the tritium waste treatment section at the Los Alamos National Laboratory. DOE

N82-28611# Oak Ridge National Lab., Tenn. Analytical Chemistry Div.
ACQUISITION AND PERFORMANCE EVALUATION OF A QUADRUPOLE MASS SPECTROMETER IN A MOBILE LABORATORY
J. R. Walton, D. H. Smith, H. S. McKown, R. L. Walker, and J. A. Carter Dec. 1981 37 p refs
(Contract W-7405-eng-26)
(DE82-004668; ORNL/TM-8027) Avail: NTIS HC A03/MF A01

A quadrupole mass spectrometer for use in a mobile laboratory was assessed for potential use as an on site inspection instrument. Samples of U, Pu, B, and Lu were analyzed. Precisions of 1 to 2% for U-235 and U-238 ratios that range from 0.01 to 17 were obtained. Concentrations as low as 1.5 ppB were measured. Plutonium isotopes ratios were measured with similar precision. Boron samples of less than 100 ng were analyzed, as were small lutetium samples (1 to 3 ng) in conjunction with possible application to nuclear accident and tank calibration requirements. DOE

N82-28612# Graz Univ. (Austria). Inst. fuer Nachrichtentechnik und Wellenausbreitung.
STUDY OF LOW ENERGY ELECTRON FLUX AND ITS REACTION TO ACTIVE EXPERIMENTATION ON SPACELAB Progress Report
R. Schmidt, W. Riedler, E. Ofner, K. Schwingenschuh, and N. Valavanoglou Jan. 1981 65 p refs In GERMAN
(INW-8101) Avail: NTIS HC A04/MF A01

Electronic units for a spectrometer for low energy particles, especially electrons, and for a magnetometer were developed for the first Spacelab flight and strongly influenced by the technological problems of the Space shuttle. Simulation of the computer on board Spacelab is depicted. Test equipment, voltage supply, interfaces, and microprocessor control for the two experiments are developed and described in detail. Author (ESA)

N82-28613# Research Inst. of National Defence, Linkoeping (Sweden).
SENSOR TECHNOLOGY [SENSORTEKNIK]
Hans Bergdal, Ola Dahlman, Erik Daniels, Folke Eklund, Bengt Granath, Hans Gunnar Helgesson, Staffan Jonsson, Bjoern Nilsson, Ove Steinvall, and Carl Hugo Aagren Feb. 1982 77 p refs In SWEDISH
(FOA-C-30262-E1) Avail: NTIS HC A05/MF A01

Sensor applications and development trends are surveyed. Seismic, acoustic, and magnetic techniques, sound transducers, radar and microwave equipment, electronically agile radar, target designators, optical devices and laser applications, Bragg receivers, charge transfer devices, computer techniques, remote control and Earth satellites, laser radar and differential absorption laser radar, geographic applications, and remote sensors for atmospheric observations are covered. Author (ESA)

N82-28614# Bureau of Mines, Amarillo, Tex.
AUTOMATIC AND CONTINUOUS TRANSDUCER-DRIFT COMPENSATOR FOR ENDPOINT DETECTION SYSTEMS
Charles A. Seitz and George M. Lucich Oct. 1981 15 p refs
(PB82-135534; BM-RI-8568) Avail: NTIS HC A02/MF A01 CSCL 14B

An automatic and continuous transducer-drift compensator is described. The compensator formed a part of the instrumentation used to indicate the saturation by hydrogen of a cryogenic, adsorption column. It has a variable delayed-response characteristic and will respond only to signals having rise times faster than component drift times. Zero drift due to varying ambient conditions and component aging is nullified. Equations relating the output as a function of the input signal are given. Author (GRA)

N82-28615# Stanford Univ., Calif. Electronics Labs.
INNOVATIVE MEASUREMENT TECHNOLOGY FOR THE SEMICONDUCTOR DEVICE INDUSTRY BASED ON ELECTRON SPECTROSCOPY Final Report, 1 Jul. 1975 - 31 Dec. 1978
C. R. Helms, S. A. Schwartz, W. E. Spicer, and N. J. Taylor (Varian Associates) Nov. 1981 12 p refs
(Contract NBS-5-35944; ARPA Order 2397)
(PB82-135922; NBS-GCR-81-345) Avail: NTIS HC A02/MF A01 CSCL 14B

Electron spectroscopy techniques used in conjunction with ion etching for characterizing materials and structures used in semiconductor device technology were investigated. The capabilities and limitations of these techniques were established and their application in studies of the chemistry, stoichiometry, and morphology of interfaces present in MOS device structures investigated. GRA

36 LASERS AND MASERS

Includes parametric amplifiers.

N82-28616* National Aeronautics and Space Administration. Pasadena Office, Calif.
HIGH POWER METALLIC HALIDE LASER Patent
Thomas J. Pivirotto, inventor (to NASA) (JPL, California Inst. of Technology, Pasadena) Issued 4 May 1982 10 p Filed 7 Feb. 1980 Supersedes N80-18381 (18 - 09, p 1142) Sponsored by NASA
(NASA-Case-NPO-14782-1; US-Patent-4,328,464; US-Patent-Appl-SN-119339; US-Patent-Class-330-4.3; US-Patent-Class-372-56; US-Patent-Class-372-58; US-Patent-Class-372-82) Avail: US Patent and Trademark Office CSCL 20E

A laser amplification system is disclosed whereby a metallic halide vapc such as copper chloride is caused to flow through a laser amplifier and a heat exchanger in a closed loop system so that the flow rate is altered to control the temperature rise across the length of the laser amplifier. The copper atoms within the laser amplifier should not exceed a temperature of 3000 K, so that the number of copper atoms in the metastable state will not be high enough to prevent amplification in the amplifier. A molecular dissociation apparatus is provided at the input to the laser amplifier for dissociating the copper chloride into copper atoms and ions and chlorine atoms and ions. The dissociation apparatus includes a hollow cathode tube and an annular ring spaced apart from the tube end. A voltage differential is applied between the annular ring and the hollow cathode tube so that as the copper chloride flows through, it is dissociated into copper and chlorine ions and atoms.

Official Gazette of the U.S. Patent and Trademark Office

N82-28617 Materials Quality Assurance Directorate, London (England).
A SURVEY OF SOME RECENT DEVELOPMENTS IN LASER RAMAN SPECTROSCOPY
C. M. Jenden Oct. 1981 22 p refs
(MQAD-TP-797; BR82096) Avail: Issuing Activity

Computer controlled Raman spectrometers, resonance Raman spectroscopy (RRS), time resolved Raman spectroscopy (TRS), the laser Raman microprobe (LRM) and coherent Raman spectroscopy (CRS) are discussed. The RRS works well with aqueous or solid substances, giving simple spectra with good resolution and detection. Fluorescence problems limit its usefulness. While TRS reduces fluorescent background scattering, and can give quantitative results from Raman spectra, it is complicated and expensive. The LRM maps each species in a heterogeneous sample, with molecular analysis of the whole sample area. Spectra can be observed in real time. Low laser power increases operating lifetime. Advantages of CRS include high conversion efficiency short spectral acquisition time and collimated output. It is not useful for media with large losses, e.g., opaque materials. Sensitivity is limited and spectra are disturbed by neighboring resonances. Author (ESA)

N82-28618*# National Aeronautics and Space Administration. Pasadena Office, Calif.
ARRANGEMENT FOR DAMPING THE RESONANCE IN A LASER DIODE Patent Application
Joseph Katz (JPL), Amnon Yariv (JPL), and Shlomo Margalit, inventors (to NASA) (JPL) Filed 4 Jun. 1982 17 p
(Contract NAS7-100)
(NASA-Case-NPO-15980-1; US-Patent-Appl-SN-385220) Avail: NTIS HC A02/MF A01 CSCL 20E

A novel arrangement for damping the resonance of a laser diode is described. The arrangement includes an additional layer which together with the conventional laser diode form a structure of a bipolar transistor. The additional layer serves as the collector, the cladding layer next to it as the base, and the active region and the other cladding layer as the emitter. A capacitor is connected across the base and the collector. At any frequency above a certain selected frequency which is far below the resonance frequency, the capacitor impedance is very low, effectively shorting the base to the collector. The capacitor is a discrete component external to the laser structure or formed as part of a monlithic structure including the laser diode and the additional layer. NASA

N82-28619*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD AND APPARATUS FOR TRANSFER FUNCTION SIMULATOR FOR TESTING COMPLEX SYSTEMS Patent Application
Michael J. Kavaya, inventor (to NASA) (JPL) Filed 11 Jun. 1982 28 p
(Contract NAS7-100)
(NASA-Case-NPO-15696-1; US-Patent-Appl-SN-387647) Avail: NTIS HC A03/MF A01 CSCL 20E

A method and apparatus for testing the operation of a complex stabilization circuit in a closed-loop system are described. A programmed analog or digital computing system for implementing the transfer function of a load, thereby providing a predictable load, comprises the method. The digital computing system employs a table stored in a microprocessor in which precomputed values of the load transfer function are stored for values of input signal from the stabilization circuit over the range of interest. NASA

N82-28620# Kigre, Inc., Toledo, Ohio.
FLUORESCENT GLASSES FOR USE IN FLUORESCENTLY PUMPING Nd-3(+) DOPED LASER GLASS
C. F. Rapp Aug. 1981 12 p refs
(Contract N00014-81-C-2376)
(AD-A107503) Avail: NTIS HC A02/MF A01 CSCL 20/5

In certain cases it may be desirable to fluorescently pump a neodymium doped laser glass rather than directly excite the laser glass with the light from a flashlamp. That is, the flashlamp energy is first absorbed in a fluorescent material which then reemits to fluorescently pump the Nd3+ laser glass. This fluorescent pumping could be beneficial in two ways; first, the short wavelength radiation which is not efficiently absorbed by the neodymium can be converted to wavelengths which are strongly absorbed; and, second, the conversion of short wavelength pump light to longer wavelengths will minimize the amount of heat generated in the laser rod. However, if the fluorescent material is to efficiently pump the neodymium, and not simply absorb and waste the short wavelength radiation from the flashlamp, it must display several characteristics. GRA

N82-28621# Kigre, Inc., Toledo, Ohio.
THE DEVELOPMENT OF A HIGH AVERAGE POWER GLASS LASER SOURCE Progress Report
John D. Myers 31 Jul. 1981 3 p
(Contract N00014-81-C-2376)
(AD-A107527) Avail: NTIS HC A02/MF A01 CSCL 20/5

Contents: Task 1: Q-100 Property Measurements; Task 2: The Cladding of Q-100; Task 3: Selective Filtering And/Or Energy Transfer to Reduce Thermal Loading; Task 4: Glass Strengthening; Task 5: Alternate Pump Sources. GRA

N82-28622# Western Research Corp., San Diego, Calif.
DESIGN SUPPORT OF A RARE GAS HALIDE LASER Final Report, 23 Jun. - 8 Oct. 1980
Richard Scheps 3 Mar. 1982 68 p refs
(Contract N00173-80-C-0226)
(AD-A112464; WRC-R-310) Avail: NTIS HC A04/MF A01 CSCL 20/5

A design and cost analysis is presented in support of construction by the Naval Research Laboratory of a large rare gas halide laser system. Key system aspects governing the design include output and energy uniformity, electrical driver design, energy deposition and electrical performance and system cost. Author (GRA)

N82-28623# Litton Systems, Inc., Morris Plains, N. J.
PREPARATION OF RARE EARTH DOPED YAG LASER MATERIALS Final Report, 1 May 1979 - 1 Oct. 1981
Roger F. Belt, Larry Drafall, and Karl Jensen Dec. 1981 33 p refs
(Contract N00173-79-C-0134; NR Proj. 370-050)
(AD-A11[illegible]508) Avail: NTIS HC A03/MF A01 CSCL 20/5

This report describes the single crystal growth, laser rod fabrication and experiments on about 25 rare earth doped YAG systems. The objective was to examine specified compositions

for possible lasing in the 1.5-4.0 micrometer range. Since a mature technology base is already available for Nd:YAG, any of the newly developed materials can be put in rapid production if necessary. The particular crystals were prepared with Er, Dy, Ho, Tm, Tm-Cr, Pr-Cr, Yb, Eu, and U dopants. Various concentrations of dopants were utilized. Large crystals were grown to extract up to 5 X 50mm laser rods. Different fabricated shapes were provided for spectroscopic studies or pumping by other lasers. Special coatings for new wavelengths were applied to permit optimum laser results. The final active testing was performed on each item at the Naval Research Laboratory. GRA

N82-28624# Rose Engineering and Research, Inc., Incline Village, Nev.

NEARFIELD AERODYNAMICS AND OPTICAL PROPAGATION CHARACTERISTICS OF A LARGE-SCALE TURRET MODEL Final Report

William C. Rose, James E. Craig (Spectron Development Lab., Inc.), and K. R. Raman (Raman Aeronautics, Inc.) Kirtland AFB, N. Mex. AFWL Feb. 1982 100 p refs

(Contract F29601-79-C-0011; AF Proj. 317J)

(AD-A113910; AFWL-TR-81-28) Avail: NTIS HC A05/MF A01 CSCL 20/6

Measurements of the unsteady flow field affecting optical propagation quality have been made with both aerodynamic and direct optical instrumentation. Properties affecting degradation of coherent radiation beams propagated from within the turret have been investigated. These properties include both the magnitude and scale sizes of the fluctuating index-of-refraction field present in the turbulent shear layers and separation regions of the turret flow field. Direct optical degradation information was obtained by holographic interferometry and quantified through techniques presented here. Aerodynamic measurements were made with hot-wire anemometry and multiple-port probes. Comparisons between the aerodynamically and optically deduced data are presented. These data can be used directly to estimate trends in expected loss of optical quality of a coherent beam for various flight speeds, altitudes, wavelengths and azimuthal turret angles. More data are now available for estimating the effects of unsteady aerodynamic flow fields on optical propagation quality. Data were obtained for Reynolds numbers near those occurring at full-scale flight conditions over a range of Mach number from 0.55 to 0.75. Investigation results generally agree with those obtained previously on smaller scale models and indicate that severe optical degradation can be present at aft-looking azimuth angles. Author (GRA)

N82-28625# Schafer (W. J.) Associates, Inc., Wakefield, Mass.

LOW VOLTAGE FREE ELECTRON LASER OPTICS

5 Mar. 1982 59 p refs

(Contract N00014-80-C-0515)

(AD-A113659; WJSA-FTR-82-193) Avail: NTIS HC A04/MF A01 CSCL 20/5

We investigated several methods of reducing the pump cavity losses in a two stage free electron laser. We have found that with metal optics, we can reduce the round trip cavity absorption losses to approx. = 0.2% with some difficulty. The cavity wall losses can be significantly decreased by resorting to superconducting optics. The limitations of this system is that the operating wavelength has to be a few millimeters and the operating temperature has to be < 2 deg K to keep the refrigeration power at a reasonable level. One has also to pay the price of the complexity of the system. For near term UCSB experiment, it was felt that room temperature silver coated optics would be the best choice. To expand the optical beam to low flux levels that the mirrors can handle, it was necessary to use near concentric resonator geometry. For such a configuration, the diffraction losses could be maintained < 0001 by choosing Fresnel number greater than or equal to 15. GRA

N82-28626# Army Missile Command, Redstone Arsenal, Ala. Research Directorate.

LASER-INDUCED REACTIONS OF NITROGEN FLUORIDES WITH NITROGEN OXIDES

J. A. Merritt, J. K. McDonald, and V. F. Kalasinsky Jan. 1982 33 p refs

(AD-A113667; AD-E950228; DRSMI/RR-82-1-TR) Avail: NTIS HC A03/MF A01 CSCL 07/2

Some laser-induced reactions of tetrafluorohydrazine, nitrogentrifluoride with nitric oxide, nitrous oxide, nitrogen dioxide or nitrosyl chloride have been studied. Absorption in the nitrogen fluorides of infrared radiation from a continuous wave carbon dioxide laser initiated a number of reactions. In all cases, the major product was FNO, and when nitrous oxide or nitrogen dioxide were used, FNO2 was also produced. The quantities of the products depended upon laser power and sample pressures. The laser-induced reactions probably proceed through a nonequilibrium thermal process rather than a true multiphoton dissociation, but certain pieces of the data are not totally consistent with this interpretation. A decomposition reaction was induced in ClNO through laser absorption by a combination band. Possible mechanisms for the various reactions and the implications of pursuing studies of laser induced chemical processes are discussed. Author (GRA)

N82-28627# Battelle Columbus Labs., Ohio.

CHEMICAL STRUCTURE BY LASER-PRODUCED X-RAYS Final Report

R. E. Schwerzel, H. M. Epstein, P. J. Mallozzi, and B. E. Campbell 2 Apr. 1982 61 p refs

(Grant AF-AFOSR-3575-78; AF Proj. 2303)

(AD-A113864; AFOSR-82-0288TR) Avail: NTIS HC A04/MF A01 CSCL 20/5

The research conducted under this grant has successfully proven the feasibility of using laser-produced X-rays to perform EXAFS experiments, and has led to the demonstration that well-resolved EXAFS spectra of light elements (such as aluminum and magnesium) can be obtained using a single multi-nanosecond pulse of laser-produced X-rays. In addition, this research has led to the development of the flash-EXAFS technique, in which the transient structural changes which occur upon thermal or optical excitation of a sample can be studied in real time (on a nanosecond time scale) by exploiting the short pulse characteristics of laser-EXAFS. It is realistic to say that an entirely new chapter in the history of structural analysis has been begun by this work, as the detailed structures of transient species can now be probed on a time scale never before possible. Author (GRA)

N82-28628# Massachusetts Inst. of Tech., Cambridge. Energy Lab.

SINTERABLE POWDERS FROM LASER DRIVEN REACTIONS Final Report, 1 Jul. 1977 - 30 Sep. 1981

John S. Haggerty Mar. 1982 177 p refs

(Contract N00014-77-C-0581; ARPA Order 3808; NR Proj. 039-153)

(AD-A114062; MIT-EL-82-002) Avail: NTIS HC A09/MF A01 CSCL 20/5

Extremely fine, uniform ceramic powders have been synthesized from SiH4 NH3 and C2H4 gas phase reactants that are heated by absorbing optical energy emitted from a CO2 laser. Resulting Si, Si3N4 and SiC powders have been characteristics in terms of parameters which are important for densification processes. They are virtually ideal. The spherical particles typically have mean diameters from 120 to 1500A. The standard deviation is typically 25-45% and the diameter of the largest observed particle is typically less than twice that of the smallest particle. Purities are extremely high. The laser heated process has been modeled in terms of fluid flow and heat transfer criteria and characterized with respect to particle growth rates and temperature distribution. Many fundamental property measurements were made to provide data for these calculations. The process is extremely efficient, approximately 95% of the SiH4 is reacted in a single pass through the laser beam and approximately 2 kwhr. of energy are required per kilo of Si3N4. The resulting powders have been processed into dense pieces using several shaping techniques. The Si powders were densified to precisely controlled levels designed to yield high density reaction bonded silicon nitride (RBSN). GRA

N82-28629# Electronics Research Lab., Adelaide (Australia)

THE CHOICE OF A LASER FOR AIRBORNE DEPTH SOUNDING

J. Richards and D. Rees Sep. 1981 17 p refs

(AD-A112901; ERL-0216-TR; AR-002-631) Avail: NTIS HC A02/MF A01 CSCL 17/7

A conventional electro-optically Q-switched laser resonator

and a polarisation coupled crossed-Porro resonator are compared for use in a frequency doubled neodymium doped yttrium aluminium garnet (Nd:YAG) laser. Laser rod diameters of 3, 4 and 5 mm are evaluated in each resonator to determine the relative merits of each rod/resonator combination in producing the required 532 nm frequency doubled output. The effect of repetition rate over the range 15 Hz to 250 Hz on the performance of each resonator and rod is examined. A lifetest is used to determine the likely problem areas in both resonators. Recommendations are made concerning the size of rod and type of resonator configuration best able to meet the requirements of a laser suitable for airborne depth sounding. Author (GRA)

N82-28630# Electronics Research Lab., Adelaide (Australia).
EVALUATION OF THE PERFORMANCE OF A LASER FOR AIRBORNE DEPTH SOUNDING
S. Rees and P. J. Wilsen May 1981 20 p refs
(AD-A112907; ERL-0190-TR; AR-002-572) Avail: NTIS HC A02/MF A01 CSCL 20/5

The performance of a conventional electro-optically Q-switched, frequency-doubled Nd:YAG laser is evaluated for a laser airborne depth sounder operating at 168 Hz. The laser more than meets the requirements of the depth sounder and successfully completed a 1000 hour lifetest. Author (GRA)

N82-28631# Naval Research Lab., Washington, D. C.
EQUIPMENT AND TRACKING TEST RESULTS FOR THE NRL SHIP-TO-SHIP DF LASER TRANSMISSION EXPERIMENT Interim Report
G. L. Trusty, T. H. Cosden, D. H. Leslie, E. S. Gaynor, and M. Douma 5 Apr. 1982 55 p
(SF59551002)
(AD-A113485; NRL-MR-4810) Avail: NTIS HC A04/MF A01 CSCL 20/6

To do absolute optical transmittance measurements between two ships requires that the light source and the receiver reciprocally track each other. This report describes the tracker equipment designed to do this measurement and the tracking ability test results of January 1982. We demonstrated a dynamic tracking error of 20 microrad in both azimuth and elevation. The modified Nike-Hercules tracker has a 32 in. primary. The receiver includes a modified 60 in. searchlight. Author (GRA)

N82-28632# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.
CO2 LASER PHOTOACOUSTIC DETECTION OF HYDRAZINE BASED ROCKET FUELS
G. L. Loper, A. R. Calloway, M. A. Stamps, and J. A. Gelbwachs 15 Mar. 1982 49 p refs
(Contract F04701-81-C-0082)
(AD-A112950; TR-0082(2945-09)-1; SD-TR-81-107) Avail: NTIS HC A03/MF A01 CSCL 20/5

This report describes recent work performed at The Aerospace Corporation to determine the capability of the CO2 laser photoacoustic technique to detect the rocket fuels hydrazine, monomethylhydrazine (MMH), and unsymmetrical dimethylhydrazine (UDMH) at low parts-per-billion (ppb) levels in the ambient air in real time. These compounds are highly toxic and recent studies indicate that they may also be carcinogens. Estimates made from CO2 laser absorption cross section data determined for the hydrazines in a previous Aerospace study indicate that the hydrazines should be detectable by the CO2 laser photoacoustic technique at the desired low ppb levels even in the presence of the ambient levels of pollutants and water vapor found in urban atmospheres. To assess the validity of these hydrazine-fuel detection estimates by the CO2 laser photoacoustic technique, various laboratory photoacoustic detection systems were assembled and their minimum detectable absorptivity values were determined during the present study. The photoacoustic detection system that provided the best performance in this study possessed optically tandem sample and reference cells connected to a differential capacitance manometer. This system was designed to minimize the effects of spurious absorption at the photoacoustic cell windows. GRA

N82-28633# Rochester Univ., N. Y. Dept. of Chemistry.
LASER-GENERATED ELECTRON EMISSION FROM SURFACES: EFFECT OF THE PULSE SHAPE ON TEMPERATURE AND TRANSIENT PHENOMENA Interim Technical Report
Jui-Teng Lin and Thomas F. George Apr. 1982 29 p refs
(Contract N00014-80-C-0472; NR Proj. 056-749)
(AD-A114282; TR-18) Avail: NTIS HC A03/MF A01 CSCL 20/5

Surface temperatures generated by gaussian, rectangular and triangular laser pulses are determined by solving a heat diffusion equation. The dependence of the temperature on the pulse shape, and in turn the dependence of the thermal diffusivity and absorbtance on the temperature, are investigated. The lifetime of an adspecies on a laser-heated solid (e.g., Cs on W) is estimated in terms of the temperature, the desorption energy and the coverage. The mechanism of laser-generated electron emission from the adspecies is analyzed by means of the Richardson equation. A condition for generating an intense electron beam is that the laser pulse duration and the rise time of the temperature must be less than the lifetime of the adspecies. Author (GRA)

N82-28634# United Technologies Research Center, East Hartford, Conn.
ELECTRON-BEAM SUSTAINED MERCURIC BROMIDE LASER STUDY Final Report, 1 Mar. 1980 - 29 Apr. 1982
William L. Nighan and Robert T. Brown 29 Apr. 1982 49 p refs Submitted for publication
(AD-A114246; UTRC/R82-925096-1) Avail: NTIS HC A03/MF A01 CSCL 20/5

Results are reported of an investigation of fundamental kinetic processes influencing discharge and laser properties typical of the 502 NM HgBr (B to X)/HgBr2 dissociation laser. Specific attention is focused on conditions representative of electron-beam controlled discharges. Experimental results and corresponding analysis and interpretation are presented for several laser mixtures, focusing particularly on the factors affecting discharge characteristics and HgBr(B) formation. A set of electron-HgBr2 cross sections inferred on the basis of analysis of experimental observations is presented, along with a discussion of the effect of electron-electron collisions on medium properties at the level of fractional ionization typical of the HgBr(B)/HgBr2 laser.
Author (GRA)

N82-28635# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
THE REMOVAL OF DF (v = 3 AND 4) BY H AND D ATOMS
Jerry F. Bott 12 Apr. 1982 26 p refs
(Contract F04701-81-C-0082)
(AD-A114436; TR-0082(2603)-1; SD-TR-82-24) Avail: NTIS HC A03/MF A01 CSCL 20/5

The deactivation rate coefficients for the removal of DF(v equal 3) and DF(v equal 4) by H and D atoms have been measured at 295 K by the technique of laser-induced fluorescence in a discharge flow-tube apparatus. The rate coefficients were found to increase dramatically with vibrational level v. Data obtained for the removal of DF(v equal 4) in the presence of H atoms have been used to infer a rate coefficient of (5 plus or minus 2) x (1011 cubic centimeters/mol-s for the reaction H plus DF(v equal 4) yield HD plus F. Author (GRA)

N82-28636# Mathematical Sciences Northwest, Inc., Bellevue, Wash.
ATTENUATION OF LARGE AMPLITUDE PRESSURE DISTURBANCES BY LIQUID DROPLETS Annual Report, 30 Sep. 1980 - 30 Sep. 1981
Williams J. Thayer, III and E. Lee Klosterman 14 Dec. 1981 27 p refs
(Contract F49620-80-C-0094; AF Proj. 2307)
(AD-A114250; AFOSR-82-0344TR) Avail: NTIS HC A03/MF A01 CSCL 20/5

This report summarizes activities carried out to investigate flow processes which govern the attenuation of large amplitude pressure disturbances in gases containing high mass fractions of liquid droplets. A shock tube driver and steady flow test section with supporting gas and liquid supplies, control and monitoring instruments have been developed for tests. The test regime includes droplet/gas mass ratios from 0.1 to 1.0, shock pressure ratios up to 5.6, and initial gas and liquid gas and liquid temperatures from ambient to 98 C. An optical diagnostic system has been developed to determine the dynamic response

of the droplet field to rapidly varying flows behind shock waves. The angular distribution of scattered light from a probe laser beam is monitored using a photodetector array and associated high frequency response dAta acquisition equipment. Data for a complete size distribution measurement is acquired and stored every 40 microsec. The scattered and attenuated light measurements using a data reduction code based on scatttering theory. The pressure wave amplitude and waveform is determined as a function of location and time using high frquency response pressure transducers. The test apparatus and diagnostic system were developed to the point of checkout testing during the first year of the program. Wave attenuation and droplet dynamics testing will begin early in the second program year. GRA

N82-28637# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
OPTICAL AND IN SITU MEASURING OF STRUCTURE PARAMETERS RELEVANT TO TEMPERATURE AND HUMIDITY AND THEIR APPLICATION TO THE MEASURING OF SENSIBLE AND LATENT HEAT FLUX
W. Kohsiek Mar. 1982 70 p refs
(AD-A114336; NOAA-TM-ERL-WPL-96; ARO-18029.2-GS) Avail: NTIS HC A04/MF A01 CSCL 20/5

Optical measurements of the structure parameters of temperature (CT2), humidity (CQ2) and temperature-humidity (CTQ) were attempted at 0.94 micron, 10.7 micron (CO2 laser) and 337 micron (HCN laser), but owing to various instrumental problems no measurement of CQ2 and CTQ could be achieved. In situ measurements of the same parameters were more successful. Two techniques of measuring structure parameters are compared: by using spaced sensors, and by time-lagging one sensor. In this way the expected r to the 2/3 power dependency of the structure parameter could be checked (r equal distance between sensors, either by spacing or by time-lagging). From the connection between structure parameters and spectra, evidence of an inertial subrange for the temperature-humidity cospectrum is found. Special attention is paid to the use of Ly-alpha hygrometry for measuring structure parameters involving humidity. Finally, relations between the structure parameters CT2 and CQ2, and the fluxes of heat and moisture are discussed; an effect of atmospheric stability was not detectable for $-z/L > 0.02$. Author (GRA)

N82-28638# Naval Research Lab., Washington, D. C.
THE 2-D NONLINEAR THEORY OF THE FREE ELECTRON LASER AMPLIFIER FOR AN ELECTRON BEAM WITH FINITE AXIAL AND TRANSVERSE DIMENSIONS Interim Report
Cha-Mei Tang and P. Sprangle 23 Apr. 1982 19 p refs
(AD-A114220; NRL-MR-4774) Avail: NTIS HC A02/MF A01 CSCL 20/5

This paper treats the growth of the radiation field in two dimensions of a free electron laser on an electron beam with finite axial and transverse dimensions in the amplifying configuration. The general, self-consistent, nonlinear analysis includes various efficiency enhancement schemes, diffraction and refraction. In the axially symmetric, low gain, resonant macro particle limit, we obtain an analytical expression for the gain. An illustration at 10.6 micrometers is given. Author (GRA)

N82-28639# Naval Research Lab., Washington, D. C.
INTERNAL HEAT DEPOSITION IN LASER HIGHLY ACCELERATED TARGETS Interim Report
B. H. Ripin, E. A. McLean, and J. A. Stamper 23 Apr. 1982 15 p refs
(Contract DE-AI08-79DP-40092)
(AD-A114206; NRL-MR-4811) Avail: NTIS HC A02/MF A01 CSCL 18/1

A novel method is described from which estimates of the internal pressure or temperature of highly accelerated material can be made. The technique is applied to Nd-laser ablatively accelerated targets and the results compare well with target rear surface temperature measurements using time-resolved optical pyrometry. Author (GRA)

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N82-28640*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPRAY APPLICATOR FOR SPRAYING COATINGS AND OTHER FLUIDS IN SPACE Patent Application
Jerome F. Kuminecz and Merlyn F. Lausten, inventors (to NASA) Filed 25 Jun. 1982 12 p Sponsored by NASA
(NASA-Case-MSC-18852-1; US-Patent-Appl-SN-392094) Avail: NTIS HC A02/MF A01 CSCL 13I

A spray applicator was developed to provide emergency thermal protection system repair by shuttle astronauts during EVA. It is essential that such a spray applicator be self contained, suitable for one handed operation, splatter and reactive free. The spray applicator includes an accumulator, a spray gun, and a spray shield. It is formed into a rigid shell having a flexible bladder containing the liquidified coating material inserted through the adapter assembly. To pressurize the bladder, there is propellant between the bladder through an outlet passageway located in head. To assure uniform distribution one or more weighted balls are located in the bladder and to assure an uninterrupted flow, a head includes a plurality of orifices. In the exiting accumulator, the coating material is channeled through a passageway in valve assembly which connects the accumulator to the spray gun assembly 13. NASA

N82-28641*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SLOW OPENING VALVE Patent Application
Donald F. Drapeau, inventor (to NASA) (Hamilton Standard, Hartford, Conn.) Filed 25 Jun. 1982 12 p Sponsored by NASA
(NASA-Case-MSC-20112-1; US-Patent-Appl-SN-392104) Avail: NTIS HC A02/MF A01 CSCL 13I

A control mechanism for an oxygen shut off valve is described. The control mechanism for the valve minimizes the rate of flow when opening is initiated, increases the rate of flow after the system is pressurized, provides adjustable operating torque, and provides additional stops to prevent overtorquing and is independent of the number of turns or pitch. To accomplish this, a shut off valve for the portable oxygen system for the shuttle orbiter has a cylindrical actuator handle connected to a differentially threaded sleeve member which is connectively attached to a ball valve via valve stem having a cup shaped plunger with aligned slots, and nonrotating screw. NASA

N82-28642*# National Aeronautics and Space Administration. Pasadena Office, Calif.
IMPROVED INGOT SLICING MACHINE Patent Application
Yu Shen Kuo, inventor (to NASA) (JPL) Filed 11 Jun. 1982 20 p
(Contract NAS7-100)
(NASA-Case-NPO-15483-1; US-Patent-Appl-SN-387648) Avail: NTIS HC A02/MF A01 CSCL 13I

A method and apparatus for simultaneously slicing one or a multiplicity of silicon boules into wafers is described. One embodiment has vertical stacks of horizontal, mutually spaced, coaxially aligned juxtaposed cutting blades; a drive for simultaneously rotating the blades; and an even plurality of chucks adapted to hold axially erect silicon boules. The chucks are disposed in pairs diametrically spaced on opposite sides of the blades for synchronous translation of the boules toward and away from the blades to balance stresses imposed on the blades in slicing off the wafers. Also a drive is used for simultaneously rotating the boules as they are positioned. Each blade is characterized by having a cutting diameter slightly greater than the cutting diameter of the blade arranged immediately above it. NASA

N82-28643*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RELIABILITY MODEL FOR PLANETARY GEAR
Michael Savage (Akron Univ.), Charles A. Paridon (Hewlett Packard Co., Sunnyvale, California), and John J. Coy (Army Aviation Research and Development Command, Cleveland, Ohio) 1982

22 p refs Proposed for Presentation at Design Engr. Tech. Conf., Washington, D.C., 12-15 Sep. 1982; sponsored by ASME Prepared in cooperation with Army Aviation Research and Development Command
(NASA-TM-82859; NAS 1.15:82859; AVRADCOM-TR-82-C-6) Avail: NTIS HC A02/MF A01 CSCL 13I

A reliability model is presented for planetary gear trains in which the ring gear is fixed, the Sun gear is the input, and the planet arm is the output. The input and output shafts are coaxial and the input and output torques are assumed to be coaxial with these shafts. Thrust and side loading are neglected. This type of gear train is commonly used in main rotor transmissions for helicopters and in other applications which require high reductions in speed. The reliability model is based on the Weibull distribution of the individual reliabilities of the transmission components. The transmission's basic dynamic capacity is defined as the input torque which may be applied for one million input rotations of the Sun gear. Load and life are related by a power law. The load life exponent and basic dynamic capacity are developed as functions of the component capacities. Author

N82-28644*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ADVANCES IN HIGH-SPEED ROLLING-ELEMENT BEARINGS
Erwin V. Zaretsky 1982 29 p refs Presented at the 16th Ann. Israel Conf. on Mechan. Engr., Haifa, Israel, 12-14 Jul. 1982; sponsored by Technion - Israel Inst. of Tech.
(NASA-TM-82910; E-1295; NAS 1.15:82910) Avail: NTIS HC A03/MF A01 CSCL 13I

Aircraft engine and transmission rolling-element bearing state-of-the-art is summarized. Author

N82-28645*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE OPTIMAL DESIGN OF INVOLUTE GEAR TEETH WITH UNEQUAL ADDENDA
Michael Savage (Akron Univ.), John J. Coy (Army Aviation Research and Development Command, Cleveland, Ohio), and Dennis P. Townsend 1982 8 p refs Presented at Tenth World Congr. on System Simulation and Sci. Computation, Montreal, 8-13 Aug. 1982; sponsored by Intern. Assoc. for Mathematics and Computers in Simulation
(NASA-TM-82866; E-1235; NAS 1.15:82866; AVRADCOM-TR-82-C-7) Avail: NTIS HC A02/MF A01 CSCL 13I

The design of a gear mesh is treated with the objective of minimizing the gear size for a given gear ratio, pinion torque, pressure angle, and allowable tooth lengths. Tooth strengths considered include scoring, pitting fatigue, and bending fatigue. Kinematic involute interference is avoided. The design variation on standard spur gear teeth called the long and short addendum system, is considered. In this system the mesh center distance and pressure angle are maintained as is the ability to manufacture the teeth with standard tooling. However, the pinion and gear tooth proportions are altered in order to obtain fewer teeth numbers for the same ratio as standard gears without kinematic involute interference. The effect of this nonstandard gearing geometry with on tooth strengths and gear mesh size are studied. For a 2:1 gearing ratio, the optimal nonstandard gear design is compared with the optimal standard gear design. Author

N82-28646*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A FINITE ELEMENT STRESS ANALYSIS OF SPUR GEARS INCLUDING FILLET RADII AND RIM THICKNESS EFFECTS
S. H. Chang (Cincinnati Univ.), R. L. Huston (Cincinnati Univ.), and J. J. Coy 1982 12 p refs Proposed for presentation at Ann. Meeting of ASME, Phoenix, Ariz., 14-19 Nov. 1982 Prepared in cooperation with Army Aviation Research and Development Command, Cleveland, Ohio
(NASA-TM-82865; E-1234; NAS 1.15:82865; AVRADCOM-TR-82-C-8) Avail: NTIS HC A02/MF A01 CSCL 13I

Spur gear stress analysis results are presented for a variety of loading conditions, support conditions, fillet radii, and rim thickness. These results are obtained using the SAP IV finite-element code. The maximum stresses, occurring at the root surface, substantially increase with decreasing rim thickness for partially supported rims (that is, with loose-fitting hubs). For fully supported rims (that is, with tight-fitting hubs), the root surface stresses slightly decrease with decreasing rim thickness. The fillet radius is found to have a significant effect upon the maximum stresses at the root surface. These stresses increase with increasing fillet radius. The fillet radius has little effect upon the internal root section stresses. Author

N82-28647# SKF Industries, Inc., King of Prussia, Pa.
HIGH FRACTURE TOUGHNESS BEARING DEVELOPMENT Final Report, 1 Apr. 1979 - 30 Sep. 1981
R. E. Maurer and N. J. Ninos Wright-Patterson AFB, Ohio AFWAL Dec. 1981 72 p refs
(Contract F33615-79-C-2007; AF Proj. 3048)
(AD-A113582; SKF-AT81D016; AFWAL-TR-81-2042) Avail: NTIS HC A04/MF A01 CSCL 11/6

The purpose of this program is to perform fatigue life tests to compare the rolling contact performance of high energy beam surface hardened VIM-VAR M50 steel with conventionally through hardened VIM-VAR M50 steel. Two groups of 6009 size ball bearings were provided for life testing; one group containing conventionally through hardened VIM-VAR M50 steel rings, the other group containing electron beam (EB) surface hardened VIM-VAR M50 steel inner rings, and conventionally through hardened VIM-VAR M50 steel outer rings. Each group consists of twenty bearings. Rolling contact fatigue life testing was performed yielding L10 lives of 91 million revolutions for the conventionally through hardened bearings, and 151 million revolutions for the bearing group containing the EB surface hardened inner rings. These lives are consistent with the expected performance of VIM-VAR M50 steel as indicated by comparison with the calculated adjusted rating L10 of 62 million revolutions. The surface hardened bearing rings represent the first application of high energy beam heat treatment to high-speed-steel rolling bearing components. GRA

N82-28648# Mechanical Technology, Inc., Latham, N. Y.
EVALUATION OF REQUIREMENTS FOR MILITARIZATION OF 3 kW FREE PISTON STIRLING ENGINE GENERATOR SETS Final Report
Thomas J. Marusak Jan. 1982 228 p
(Contract DAAR70-81-C-0115)
(AD-A113409; MTI-82TR20) Avail: NTIS HC A11/MF A01 CSCL 10/2

The design evaluation study assessed the capability of the free-piston Stirling engine (FPSE) to meet requirements for military mobile electric ground power. Operational requirement parameters included physical, thermodynamic, audio, material, operational, and electrical. Test data and design calculations indicated that, with continued development, the FPSE can meet or exceed all of the military requirements for 3 kW silent tactical generators operating on military logistic fuels. Author (GRA)

N82-28649# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
MATERIALS RESEARCH FOR ADVANCED INERTIAL INSTRUMENTATION. TASK 2: GAS BEARING MATERIAL DEVELOPMENT Research Report, 1 Oct. 1980 - 30 Sep. 1981
D. Das, K. Kumar, E. Wettstein, and J. Wollam Dec. 1981 103 p refs
(Contract N00014-77-C-0388)
(AD-A113518; R-1528; TR-4) Avail: NTIS HC A06/MF A01 CSCL 13/9

The gas bearing materials development program includes three approaches: chemical vapor deposition and subsequent reactive diffusion of boron on beryllium, ion implantation of boron into beryllium, and development of a beryllium-ceramic composite material. The chemical vapor deposition (CVD) process at (higher) temperatures of 850 to 950 C produced thin, hard, multiphase coatings compared to thicker coatings of boron at lower temperatures of 700 to 800 C. No deterioration of quality was observed upon increasing the sample size. Conventionally machined, and subsequently stress-relieved, beryllium discs were polished and implanted with boron. Experiments showed that for an identical surface concentration a flat boron profile was substantially superior in terms of resisting wear, compared

to a graded boron distribution. This indicated that the wear mechanism was strongly influenced by what existed in the subsurface regions in addition to the conditions in the immediate region of contact. Differences were observed for the friction traces of the implanted specimens with respect to beryllium. Additional lapping studies were performed during this reporting period on the Be-TiB2 materials with fine diamond particles as the abrasive medium. The use of diamond resulted in damage (observed primarily as pits) in the TiB2 particles dispersed in the composite. GRA

N82-28650# GARD, Inc., Niles, Ill. Electronic Systems Dept.
ACOUSTIC EMISSION MONITORING OF PRODUCTION ARMOR PLATE WELDS Final Report, Sep. 1980 - Sep. 1981
R. A. Groenwald, T. A. Mathieson (Army Tank-Automotive Command, Warren, Mich.), and C. T. Kedzion Warren, Mich. Army Tank-Automotive Command Sep. 1981 84 p
(Contract DAAE07-80-C-9113)
(AD-A114419; TACOM-12609) Avail: NTIS HC A05/MF A01 CSCL 14/2

The work reported herein is the Phase 2 of a planned 3-Phase program to establish Acoustic Emission (AE) as a means to inspect armor plate welds, to provide a means of overcoming the intrinsic disadvantages of the standard weld inspection techniques of radiography and ultrasonics. The first program phase, completed in October 1979, established the feasibility of using AE for this application by monitoring the laboratory welding of armor plate with the controlled induction of critical flaws.
Author (GRA)

N82-28651# Oak Ridge Y-12 Plant, Tenn. Metals and Ceramics Dept.
COMPARISON OF LASER WELDS IN TWO STAINLESS STEELS
T. A. Jones 9 Nov. 1981 45 p
(Contract W-7405-eng-26)
(DE82-004699; Y/DV-180) Avail: NTIS HC A03/MF A01

Laser welds in types 304L and 316 stainless steel were compared and no significant differences in the weld bead characteristics were found. The effects of the laser parameters on the welds were also examined. When the pulse length is increased, the spot size and spot overlap decreases, but the penetration remains the same. Increases in frequency result in an increase in percent overlap and decrease in spot size and penetration. When the power is increased, the penetration, overlap, and spot size increase. DOE

N82-28652# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.
THE INFLUENCE OF THE WORKING FLUID ON A TURBINE AND RANKINE CYCLE DESIGN EFFICIENCY [DER EINFLUSS DES FLUIDS AUF DIE TURBINE UND DEN ANLAGENWIRKUNSSGRAD VON RANKINE-KREISLAEUFEN]
G. Schmidt 1 Feb. 1982 17 p refs In GERMAN
(MBB-UR-535-82-O) Avail: Issuing Activity

Application of the Rankine cycle with organic fluids for the water/steam conversion process as part of a solar power plant and heating network design is considered. For the realistic modelling of turbines and their efficiency, thermodynamic characteristics are compared in terms of the influence of different working fluids. These are toluol, pyridine, hexafluorobenzol, thiophene, and fluoridated butytetrahydrofurane. The possibility of matching turbine design criteria to working fluid characteristics in order to increase operating efficiency is demonstrated.
Author (ESA)

N82-28653# Cambridge Univ. (England). Dept. of Engineering.
A FIRST REPORT ON WELDING DIAGRAMS
M. F. Ashby and K. E. Easterling (Lulea Univ.) 1981 40 p refs
(PB82-134602; CUED/C-MATS/TR-82-1981;
ISSN-0309-6505) Avail: NTIS HC A03/MF A01 CSCL 13E

Data for carbide dissolution and grain growth in the heat affected zone of a weld can be assembled into a diagram showing the extent of each, for different weld cycles, and at different points in the zone. The diagrams are based on elementary kinetic models for grain growth and carbide dissolution, integrated over the weld cycle. The sets of kinetic constants which appear in such a treatment are determined by fitting the equations to data from real or simulated welds, at certain fixed points. Diagrams are presented for six steels. As well as summarizing much data they allow the effect of change in weld procedure, or of preheat, to be predicted. GRA

N82-28654# Southwest Research Inst., San Antonio, Tex.
EMISSION CHARACTERIZATION OF AN ALCOHOL/DIESEL-PILOT FUELED COMPRESSION IGNITION ENGINE AND ITS HEAVY-DUTY DIESEL COUNTERPART Final Report, Aug. 1980 - Aug. 1981
Terry L. Ullman and Charles T. Hare Aug. 1981 239 p refs
(Contract EPA-68-03-2884)
(PB82-154113; EPA-460/3-81-023) Avail: NTIS HC A11/MF A01 CSCL 21G

Results from emissions testing of a prototype diesel engine, developed by Volvo Truck Corporation of Sweden, which uses pilot injection of diesel fuel for compression ignition of alcohol fuel injection for main combustion are described. In addition to this dual fuel engine, emission testing was also conducted on a heavy-duty diesel engine of similar design. Both engines were tested over the 1979 13-mode FTP, or shorter versions of this modal test, and over the 1984 Transient FTP as well as an experimental bus cycle. The dual-fuel engine was characterized with methanol, ethanol and ethanol with 30 percent water (wt %). An oxidation catalyst was also used with methanol and ethanol. Emission characterization included regulated emissions (HC, CO, and NOX) along with total particulate, unburned alcohols, individual hydrocarbons, aldehydes, phenols and odor. GRA

N82-28477# Technical Univ. of Denmark, Lyngby.
CURRENT TOPICS IN ROTORDYNAMICS RESEARCH
J. W. Lund *In* Shock and Vibration Information Center The Shock and Vibration Digest, Volume 14, No. 6 Jun. 1982 p 3-7 refs (For primary document see N82-28476 19-31)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $140.00/annual CSCL 20/11

N82-28479# Oklahoma State Univ., Stillwater. Dept. of Mechanical and Aerospace Engineering.
SEISMIC ANALYSIS OF ROTATING MECHANICAL SYSTEMS. A REVIEW
V. Srinivasan and A.H. Soni *In* Shock and Vibration Information Center The Shock and Vibration Digest, Volume 14, No. 6 Jun. 1982 p 13-19 refs (For primary document see N82-28476 19-31)
(Grant NSF CEE-81-08119)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $140.00/annual CSCL 20/11

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N82-28655# Battelle Columbus Labs., Ohio.
TREND INSPECTION STATION FOR PRINTED CIRCUIT BOARD SOLER JOINTS, ULTRASONIC SUBSYSTEM Final Engineering Report on Phase 2.2
T. S. Shilliday, F. B. Stulen, T. L. Fletcher, and D. Becker 29 Sep. 1981 59 p
(Grant F09603-80-G-0420)
(AD-A112918) Avail: NTIS HC A04/MF A01 CSCL 13/5

This is the Final Engineering Report on Phase 2.2 work on the ultrasonic subsystem for the trend inspection station for printed circuit board solder joints. The report discusses activities during this contract period in six major areas. Probe assemblies have been refined by redesigning both receiver and transmitter to permit closer spacing of these probes for inspection of small joints. In addition, transmitter design has resulted in a new style probe. Based in part on the characteristics of ultrasonic spectra

of the solder joint types of interest, and in part on the mental processes used in visual evaluation of joint spectra to make a judgment on joint quality, several algorithms have been investigated for computerizing the decision making process. A simple but effective algorithm has been devised for use with the latest probe set in inspecting good lap solder joints and those with heel cracks. A probe manipulator for the pilot model of the ultrasonic subsystem was designed and constructed during this contract period. It was used in some of the later experimentation in this period directed to defining performance capability. GRA

N82-28656# Naval Research Lab., Washington, D. C. Physical Metallurgy Branch.

NON-DESTRUCTIVE EVALUATION OF DEFECTS IN STRUCTURAL MATERIALS USING LONG-WAVELENGTH NEUTRONS Annual Report, Nov. 1980 - Dec. 1981

M. Fatemi and B. B. Rath 2 Apr. 1982 37 p refs
(AD-A113500; NRL-MR-4749; AR-3) Avail: NTIS HC A03/MF A01 CSCL 14/5

Small-angle neutron scattering (SANS) measurements were performed on several structural alloys to study voids and microporosities in powder consolidates of Al and Fe base alloys. The evolution of precipitates in Al-4%Cu and in beta III Ti alloys subjected to varying annealing temperatures and times, and the nucleation and growth of voids formed during creep and superplastic forming in alloys. The theta' to theta' phase transformation in Al-4%Cu was measured and analyzed. Calculated size density distributions show the coarsening of theta' phase with simultaneous disappearance of theta' as a function of annealing times at 190 C. From these observations, the average size of precipitates at each stage was calculated and compared with electron micrographic results. Similarly the precipitation of omega phase in beta III titaium was observed for several annealing temperatures (600 F to 800 F) and aging times (2 min. to 100 hrs.). GRA

N82-28657# Virginia Polytechnic Inst. and State Univ., Blacksburg.

QUALITY CONTROL AND NONDESTRUCTIVE EVALUATION TECHNIQUES FOR COMPOSITES. PART 7: THERMOGRAPHY: A STATE-OF-THE-ART REVIEW Final Report, 1 Dec. 1980 - 15 May 1981

E. G. Henneke and K. L. Reifsnider St. Louis Army Aviation Research and Development Command Mar. 1982 55 p refs
(Contract DAAG29-76-D-0100)
(AD-A114392; USAAVRADCOM-TR-82-F-5-Pt-7) Avail: NTIS HC A04/MF A01 CSCL 11/4

A review of techniques available for the application of thermographic nondestructive testing and evaluation techniques is presented. General information on contact and noncontact methods of temperature measurement are discussed as these pertain directly to thermography. Special emphasis is placed on noncontact, infrared methods as these can be used for real-time observations. Practical information on the procedures which have proven useful for application of thermography to composites is discussed in some detail. In addition, present equipment which is available commercially for such tests and important test parameters which must be selected for proper observations and interpretations are discussed. Finally, a brief survey of the literature on the application of thermography to composites is given.
Author (GRA)

N82-28658# Auburn Univ., Ala. Dept. of Mechanical Engineering.

RELIABILITY GROWTH OF CONTINUOUS SYSTEMS Final Technical Report, 10 Feb. 1981 - 12 Feb. 1982

Darrell D. Penrod Redstone Arsenal, Alabama Army Missle Command. 8 Feb. 1982 27 p refs
(Contract DAAH01-81-M-A138)
(AD-A114099; AD-E950243; DRSMI/QR-1-TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

A three parameter reliability growth model is developed for continuous systems, which model assumes failure rates are improved only after each failure and times between failures are exponential. The basic model is given by lambda sub n = lambda sub u + alpha n (lambda sub o - lambda sub u) where lambda sub n is the failure rate after the nth failure, lambda sub o is the initial failure rate, lambda sub u is the ultimate failure rate, and alpha is a shape parameter. Both maximum likelihood and Bayesian methods of estimating the parameters from test data were investigated. Use of the model for assessment and prediction are addressed and some comparisons are made with the AMSAA model currently in use. GRA

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance*.

N82-28659# Shock and Vibration Information Center (Defense), Washington, D. C.

THE SHOCK AND VIBRATION DIGEST, VOLUME 14, NO. 5 Monthly Report

Judith Nagle-Eshlemen, ed. May 1982 89 p refs
(AD-A115091) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $20.00/set CSCL 20/14

The use of the computer in the fatigue design of machine elements; the design and application of damping materials and treatments for high temperature vibration control; and the use of base isolation for earthquake protection are examined. For individual titles, see N82-28660 through N82-28662.

N82-28660# Tennessee Technological Univ., Cookeville. Dept. of Mechanical Engineering.

FATIGUE DESIGN OF MACHINE ELEMENTS

C. Bagci *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 14, No. 5 May 1982 p 3-12 refs (For primary document see N82-28659 19-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $20.00/set CSCL 20/11

Literature review articles on the state of the art of fatigue design of machine elements describe recent developments and research results and their applications for industrial designs. The following are emphasized: new forms of design equations that are suitable for computer-aided-designs; factors affecting fatigue life and their incorporation in design equations; and evaluation of proposed criteria for the fatigue design of machine members experiencing complex stress fields. The historical background of fatigue design of machine elements is summarized and recent forms of data and fatigue design equations are reviewed. A.R.H.

N82-28661# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

HIGH TEMPERATURE DAMPING OF DYNAMIC SYSTEMS

D. I. G. Jones *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 14, No. 5 May 1982 p 13-15 refs (For primary document see N82-28659 19-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $20.00/set CSCL 20/11

Progress is described in three major areas of high temperature vibration control technology: (1) development of high temperature polymeric and vitreous enamel damping materials, and measurement and characterization of the damping behavior of these materials; (2) practical design and application of damping treatments in industry and commerce; and (3) frictional damping at interfaces. Author

N82-28662# California Univ., Berkeley. Div. of Structural Engineering and Structural Mechanics.

ASEISMIC BASE ISOLATION

J. M. Kelly *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 14, No. 5 May 1982 p 17-25 refs (For primary document see N82-28659 19-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $20.00/set CSCL 20/11

Although the concept of base isolation is based on accepted physical principles, it is readily accepted by the structural engineering profession, perhaps because the concept runs counter to conventional methods of aseismic design. A base isolated structure is decoupled from the damaging horizontal components of earthquake ground motion by a mechanism that prevents or

reduces the transmission of horizontal acceleration into the structure. Many base isolation schemes were proposed during the last century, but virtually all remained unimplemented until the concept became a practical reality with the recent development of multilayered elastometric bearings. This development began with the design of bearings for bridges and bearings used to isolate structures from ground-borne acoustic vibration. The development of base isolation, experimentation on the concept, and the application of the concept to several completed structures are described. Author

N82-28663 Defence Research Information Centre, Orpington (England).
THE EFFECT OF STRESS TRIAXIALITY ON THE OCCURRENCE OF DUCTILE FRACTURE IN LOW STRENGTH STEELS
Akio Otsuka, Takashi Miyata, Nishimura Seiji, Masayasu Kimura, and Muneto Mabuchi Mar. 1982 17 p refs Transl. into ENGLISH from Zairyo (Japan), v. 29, no. 322, 1980 p 717-723 Presented at 27th General Conf. of Japan Mater. Sci. Assoc., 24 May, 1978
(DRIC-T-6493; BR82847) Copyright. Avail: Issuing Activity

Tensile tests on circumferentially notched round bar specimens of SS41 and SM50C steels were carried out in order to clarify the effect of stress triaxiability on ductile fracture initiation. Tests were also conducted on specimens with slit or fatigue cracks in order to obtain the relation between fracture toughness and the condition of ductile fracture initiation. Plastic strain at the ductile crack initiation decreases sharply with increase of stress triaxiality in the range where the ratio of mean stress to effective stress is smaller than 1:2, but becomes almost constant for larger ratios. Author (ESA)

N82-28664*# Boeing Aerospace Co., Kent, Wash.
CRYOGENIC PERFORMANCE OF SLOTTED BRAZED RENE 41 HONEYCOMB PANELS Final Report
Andrew K. Hepler and Allan R. Swegle Washington NASA Jun. 1982 89 p refs
(Contract NAS1-14213)
(NASA-CR-3525; NAS 1.26:3525; D180-26653-1) Avail: NTIS HC A05/MF A01 CSCL 20K

Two brazed Rene 41 honeycomb panels that would incorporate a frame element were designed, fabricated and tested. The panels were representative of the lower surface of an advanced space transportation vehicle. The first panel was a two span panel supported by a center frame and on edges parallel to it. The second panel was a two span panel supported by a center frame and on edges parallel to it. The second panel was a three span panel supported on two frames and on edges parallel to the frames. Each panel had its outer skin slotted to reduce the thermal stresses of the panel skins. The first panel was tested under simulated boost conditions that included liquid hydrogen exposure of the frame and inner skin and radiant heat to 478K on the outer skins. The first panel was tested to investigate the effect of thermal stresses in skins and core caused by the panel being restrained by a cold integral frame and to observe the effects of frost formation and possible liquid air development in and around outer skin slots. S.L.

N82-28665*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
BUCKLING TEST OF A 3-METER-DIAMETER CORRUGATED GRAPHITE-EPOXY RING-STIFFENED CYLINDER
Randall C. Davis Jul. 1982 28 p refs
(NASA-TP-2032; L-14659; NAS 1.60:2032) Avail: NTIS HC A03/MF A01 CSCL 20K

A three m diameter by three m long corrugated cylindrical shell with external stiffening rings was tested to failure by buckling. The corrugation geometry for the graphite epoxy composite cylinder wall was optimized to withstand a compressive load producing an ultimate load intensity of 157.6 kN/m without buckling. The test method used to produce the design load intensity was to mount the specimen as a cantilevered cylinder and apply a pure bending moment to the end. A load introduction problem with the specimen was solved by using the BOSOR 4 shell of revolution computer code to analyze the shell and attached loading fixtures. The cylinder test loading achieved was 101 percent of design ultimate, and the resulting mass per unit of shell wall area was 1.96 kg/sq m. S.L.

N82-28666*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
IMPROVED FINITE ELEMENT METHODOLOGY FOR INTEGRATED THERMAL STRUCTURAL ANALYSIS Progress Report, period ending 30 Jun. 1982
Pramote Dechaumphai and Earl A. Thornton Jun. 1982 201 p refs
(Grant NsG-1321)
(NASA-CR-169126; NAS 1.26:169126) Avail: NTIS HC A10/MF A01 CSCL 20K

An integrated thermal-structural finite element approach for efficient coupling of thermal and structural analysis is presented. New thermal finite elements which yield exact nodal and element temperatures for one dimensional linear steady state heat transfer problems are developed. A nodeless variable formulation is used to establish improved thermal finite elements for one dimensional nonlinear transient and two dimensional linear transient heat transfer problems. The thermal finite elements provide detailed temperature distributions without using additional element nodes and permit a common discretization with lower order congruent structural finite elements. The accuracy of the integrated approach is evaluated by comparisons with analytical solutions and conventional finite element thermal structural analyses for a number of academic and more realistic problems. Results indicate that the approach provides a significant improvement in the accuracy and efficiency of thermal stress analysis for structures with complex temperature distributions. Author

N82-28667 Defence Research Information Centre, Orpington (England).
THE USE OF POLAROGRAPHIC AND POTENTIOMETRIC METHODS IN STRUCTURAL ANALYSIS
H. W. Nuernberg (Kernsforschungsanlage Juelich GmbH, West Germany) Mar. 1982 50 p refs Transl. into ENGLISH from Z. Anal. Chem. (Germany), no. 273, 1975 p 432-448 Presented at Plenary Lecture Symp. on Struct. Anal. of Organic and Inorganic Compounds, Lindau, West Germany, 10-12 Jun. 1974
(DRIC-T-6575; BR82845) Copyright. Avail: NTIS HC A03/MF A01

The application of polarographic and potentiometric methods to the structural analysis of dissolved organic substances is described. Stereochemical findings, resulting from the half-stage potential, are discussed together with the possibilities derived from polarography for explaining the relationships between the rates of fast homogeneous chemical reactions in solution. The structure of the reactants is illustrated through the proton transfer processes. Correlations between half-stage potential and the structure-dependent parameters of linear free-energy relationships are reviewed. Structural effects at the electrode/solution interface are discussed. Author (ESA)

N82-28668 National Physical Lab., Teddington (England). Div. of Materials Applications.
THE DESIGN OF CAMS FOR CREEP TESTING AT CONSTANT STRESS
M. S. Loveday and M. A. J. Postlethwaite (Surrey Univ., England) Mar. 1982 41 p refs
(NPL-DMA(B)-23; ISSN-0143-7313) Copyright. Avail: NTIS HC A03/MF A01

Methods of designing constant stress cams for a single lever uniaxial creep machine are discussed. Cam profiles calculated assuming that the specimen loading bars are connected to the lever either by conventional knife edges or by a flexible strap around a constant radius cam, are compared. A tensile specimen for use with a constant stress lever is presented. Tests with a 30 kN uniaxial creep machine show that a knife edge is an attractive alternative to flexible strap coupling for connecting the specimen loading train to a constant stress cam lever. Geometric drawing of cam profiles proves to be simpler than calculating the cam coordinates mathematically. Uniaxial specimens with a slightly larger diameter between the extensometer knife edges and the grip ends compared with gage diameter are unsuitable for use with constant stress cams. Author (ESA)

N82-28669# Forest Products Lab., Madison, Wis.
ANALYSIS OF CONTINUOUS BEAMS WITH JOINT SLIP
Lawrence A. Soltis Jul. 1981 19 p refs Sponsored by the Dept. of Agriculture
(AD-A107112; FPL-FSRN-0244) Avail: NTIS HC A02/MF A01 CSCL 13/5

A computer analysis with user guidelines to analyze partially continuous multi-span beams is presented. Partial continuity is due to rotational slip which occurs at spliced joints at the supports of continuous beams such as floor joists. Beam properties, loads, and joint slip are input; internal forces, reactions, and deflections are output. GRA

N82-28670# Princeton Univ., N. J. Dept. of Chemical Engineering.
AUTOMATED TORSION PENDULUM: CONTROL AND DATA COLLECTION/REDUCTION USING A DESKTOP COMPUTER
John B. Enns and John K. Gillham Apr. 1982 36 p refs Submitted for publication
(Contract N00014-76-C-0200; NR Proj. 356-504)
(AD-A113038; TR-24) Avail: NTIS HC A03/MF A01 CSCL 09/2

A torsion pendulum interfaced with a desktop computer form an automated instrument for dynamic mechanical characterization of polymeric materials. The computer controls the initiation of the oscillation, collects the digitized data and calculates the shear modulus and loss modulus from the damped oscillations, utilizing one of four methods of analysis: (1) fitting the data points about the maxima and minima to a quadratic equation to obtain their times and amplitudes, from which the frequency and logarithmic decrement can be calculated; (2) fitting the data to a four-parameter equation of motion by a least squares technique; (3) fitting the data to a six-parameter solution to the equation of motion by a non-linear least squares technique; and (4) taking the Fourier transform of the data, which results in a maximum at the frequency of the oscillation whose amplitude is inversely proportional to the damping coefficient.
Author (GRA)

N82-28671# National Inst. for Aeronautics and Systems Technology, Pretoria (South Africa).
PROCEEDINGS OF THE CONFERENCE ON FINITE ELEMENT METHODS IN SOUTH AFRICA
[1982] 509 p refs Proc. held in Pretoria, 17-18 Mar. 1981
Avail: NTIS HC A22/MF A01

Concepts involved in the formulation of bending finite elements are reviewed. Special reference is made to the development of an isoparametric nonuniform 3D beam finite element for linear static and dynamic analysis. Advantages and problem areas inherent in this particular formulation are investigated. Other bending finite elements are also briefly discussed. Numerical examples and results are presented in order to illustrate important characteristics of the elements discussed. S.L.

N82-28672# Army Armament Research and Development Command, Watervliet, N. Y. Larger Caliber Weapon Systems Lab.
THERMAL RELAXATION IN AUTOFRETTAGED CYLINDERS Final Report
Joseph F. Throop, John H. Underwood, and Gregory S. Leger Mar. 1982 45 p refs
(AD-A113210; ARLCB-TR-82004) Avail: NTIS HC A03/MF A01 CSCL 20/11

This report presents an experimental study on the loss of bore expansion and change of residual stresses in autofrettaged cylinders, resulting from internal heating combined with external cooling. It provides information useful in the design of pressure vessels operating at high temperature. Two foot long cylinders were heated internally to bore temperatures up to 950 deg F and simultaneously cooled externally to produce a temperature difference of as much as 725 deg F from bore to outside surface. Reduction of the autofrettage bore expansion and reduction of residual stresses resulted, because the thermal stresses added to the residual stresses and exceeded the lowered yield strength at elevated temperature, permitting relaxation to occur. The data reveal that under certain temperature conditions a considerable portion of the autofrettage induced bore expansion and the associated residual stresses can be lost in a few minutes when external cooling occurs. The experimental results indicate that partial overstrain in autofrettage may be preferable to full overstrain in order to minimize the loss in residual stress. Author (GRA)

N82-28673# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 14, NO. 4 Monthly Report
Judith Nagle-Eshleman, ed. Apr. 1982 107 p refs
(AD-A114448) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $20.00/set CSCL 20/11

Qualification testing, structural frequency response data and hygrothermoviscoelasticity of composites are discussed. For individual titles, see N82-28674 through N82-28676.

N82-28674# Southwest Research Inst., San Antonio, Tex.
THE CHANGING DIMENSIONS OF QUALIFICATION TESTING
H. N. Abramson *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 14, No. 4 Apr. 1982 p 3-19 refs Presented at the 52nd Shock and Vibration Symp., New Orleans, 28 Oct. 1981 (For primary document see N82-28673 19-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $20.00/set CSCL 20/11

The changing dimensions of qualification testing are demonstrated. In the one case the objective is mission integrity. It is achieved principally through generic testing; that is, the environment is a stable one. In the other case, the objective is operational reliability. It is achieved mostly through custom testing; that is, the environment is an unstable one. Author

N82-28675# Polytechnic Inst. of Bucharest (Rumania).
ANALYSIS OF MEASURED STRUCTURAL FREQUENCY RESPONSE DATA
M. Rades *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 14, No. 4 Apr. 1982 p 21-32 refs (For primary document see N82-28673 19-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $20.00/set CSCL 20/11

Computer-aided analysis of data obtained by single vibrator excitation and the development of multi-vibrator excitation techniques are discussed. Author

N82-28676# Alabama Univ., Huntsville. Dept. of Mechanical Engineering.
RECENT DEVELOPMENTS IN HYGROTHERMOVISCOELASTIC ANALYSIS OF COMPOSITES
T. J. Chung *In* Shock and Vibration Information Center The Shock and Vibration Digest, Vol. 14, No. 4 Apr. 1982 p 33-40 refs (For primary document see N82-28673 19-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $20.00/set CSCL 20/11

Constitutive theories of hygrothermomechanical behavior of viscoelastic composites are reviewed. Author

N82-28677# Akron Univ., Ohio. Inst. of Polymer Science.
CRACK VELOCITIES IN NATURAL RUBBER
A. N. Gent and P. Marteny May 1982 31 p refs Submitted for publication Sponsored in part by Lord Corp.
(Contract N00014-76-C-0408; NR Proj. 092-555)
(AD-A114298; TR-17) Avail: NTIS HC A03/MF A01 CSCL 11/10

Measurements are reported of the limiting velocity of a running crack in biaxially stretched sheets of unfilled and carbon-black-filled natural rubber. The crack velocity was found to increase with the cleavage stain ey and also with the strain e(x) parallel to the direction of tearing reaching values of over 100m/s at the highest strain levels employed. These crack velocities are shown to be close to those predicted by Mott's theory, i.e., about one-third of the velocity of sound, when a strong strain-dependence is recognized for the velocity of a sound in rubber. GRA

N82-28678# Colorado Univ., Boulder. Dept. of Civil, Environmental and Architectural Engineering.
CONSTITUTIVE RELATIONS OF RANDOMLY ORIENTED STEEL FIBER REINFORCED CONCRETE UNDER MULTIAX-

IAL COMPRESSIVE LOADINGS
Daniel E. Egging, K. Hon-Yim, and Chuan C. Feng Dec. 1981 501 p refs
(Grant AF-AFOSR-0065-79)
(AD-A114168; AFOSR-82-0122TR) Avail: NTIS HC A22/MF A01 CSCL 20/11

A review of the state-of-the-art research on steel fiber reinforced concrete (SFRC) is given and a review of the behavior and strength of plain concrete subjected to multiaxial stresses is presented. Two series of tests on SFRC were conducted. The first preliminary series, provides results of some basic tests on concrete randomly mixed with each of five types of commercially available steel fibers. This information allowed the determination of the optimum fiber to use in the second, final test series, where the properties of SFRC under three dimensional compressive loadings are investigated. The conclusions drawn from the test results are that the addition of steel fibers to plain concrete increases the toughness, ductility and stiffness of the material. The greatest improvement of the tensile strength is provided by the longer fibers, whereas the opposite is true regarding the compressive strength. The reproducibility of the experimental results is good and the SFRC proved to be nearly isotropic as observed from the multiaxial tests. GRA

N82-28679# Maryland Univ., College Park. School of Engineering.
QUASI-SQUARE HOLE WITH OPTIMUM SHAPE IN AN INFINITE PLATE SUBJECTED IN IN-PLANE LOADING. OPTIMIZATION OF INNER AND OUTER BOUNDARIES OF BEAMS AND PLATES WITH HOLES
A. J. Durelli and K. Rajaiah Apr. 1982 33 p refs
(Contract N00014-81-K-0186)
(AD-A114370; Rept-58; Rept-59) Avail: NTIS HC A03/MF A01 CSCL 20/11

This paper (Report no. 58) deals with the optimization of the shape of the corners and sides of a square hole, located in a large plate and subjected to in-plane loads, with the object of minimizing stress concentrations. Appreciable disagreement has been found between the results obtained previously by other investigators. In this paper new tests have been conducted and discrepancies have been corrected. Using an optimization technique, the authors have developed a quasi square shape which introduces a stress concentration of only 2.54 in a uniaxial field, the comparable value for the circular hole being 3. The efficiency factor of the proposed optimum shape is 0.90 whereas the efficiency factor of the best shape developed previously was 0.71. The shape also is developed that minimizes the stress concentration in the case of biaxial loading when the ratio of biaxiality is 1:-1. This paper (Report no. 59) presents optimized shapes of inner and outer boundaries for three specific problems: a long rectangular plate with a central hole subjected to uniaxial tension, a simply-supported slotted beam subjected to a load uniformly distributed over a small area at the center, and a square plate with a central hole under uniaxial uniform pressure. The two-dimensional photoelastic method is used for optimization. The results indicate a significant reduction in stress concentration factor or in weight, or in both. GRA

N82-28680# Sandia Labs., Albuquerque, N. Mex.
MULTI-FRAC TEST SERIES Final Report
Richard A. Schmidt, Norman R. Warpinski, Sharon J. Finley, and R. C. Shear Nov. 1981 188 p refs
(Contract DE-AC04-76DP-00789)
(DE82-004514; SAND-81-1239) Avail: NTIS HC A09/MF A01

A series of five full scale tests performed to evaluate various multi-frac concepts is described. The tests were conducted in horizontal boreholes drilled in ash-fall tuff from a tunnel under 1300 ft of overburden. DOE

N82-28681# Sandia Labs., Albuquerque, N. Mex. Acceptance Technology Div.
APPLIED STRESS DETERMINATION USING COMPUTERIZED ULTRASONIC TECHNIQUES
G. H. Thomas and A. F. Emery (Washington Univ.) Sep. 1981 18 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003894; SAND-81-8777) Avail: NTIS HC A02/MF A01

A computer based ultrasonic test bed was used to acquire and process ultrasonic data in a combined analytical and experimental program to investigate potential correlations of ultrasonic signal characteristics with applied stress states. Variations in acoustic properties caused by known stress states were first studied using a finite element computer code. These studies guided the experimental efforts to measure minute changes in the acoustic characteristics, particularly attenuation. Also, spectral analysis and pattern recognition techniques were instrumental in the correlation of the ultrasonic waveforms with stress levels. DOE

N82-28682# Brown Univ., Providence, R. I. Div. of Engineering.
INVESTIGATION OF THE TENSILE DEFORMATION AND FRACTURE OF DUAL-PHASE STEEL
A. F. Szewczyk Nov. 1981 65 p refs
(Contract DE-AC02-80ER-10556)
(DE82-007522; DOE/ER-10556/86; TR-86) Avail: NTIS HC A04/MF A01

The tensile deformation and fracture of a commercial dual phase steel was analyzed with emphasis on the roles that the individual phases have in these processes. The deformation of ferrite is somewhat inhomogeneous, as suggested by the nonuniform appearance of slip lines in ferrite grains. The plastic deformation of martensite, as determined by changes in the particles' average aspect ratio, was appreciable only at strains much higher than the uniform strain to necking. The mechanism of failure was one of void formation, growth and coalescence. Void formation most frequently occurred between the poles of two closely spaced martensite particles situated on ferrite grain boundaries. DOE

N82-28683# Statens Provningsanstalt, Boraas (Sweden). Abt. Mechanik.
HYDRAULIC TESTS OF TANKS FOR DANGEROUS GOODS [HYDRAULISCHE DRUCKPRUEFUNG VON BEHAELTERN FUER GEFAERLICHE GUETER. ERMITTLUNG DES PRUEFDRUCKES]
Haąkan Torstensson 1982 14 p refs In SWEDISH
(SP-RAPP-1982:01; ISSN-0280-2503) Avail: NTIS HC A02/MF A01

Physical properties of liquids are reviewed for computing the total pressure in tanks for temperatures up to 50 or 55 C. For the test pressure, a safety margin of 50% is added to the determined pressure head. The thermal expansion of liquid and tank are dealt with and the effect of dissolved air is emphasized. Examples are given for methyl alcohol, ethyl alcohol, xylene, ethyl ether, water, and 38% HCl. When the air locked up in the tank is dissolved to a great extent in the liquid, as occurs for methyl alcohol and many organic substances, total pressure equals approximately atmospheric pressure plus vapor pressure. But for aqueous solutions and in most cases for acids, a great deal of the air remains in the gas phase and the other factors, such as liquid expansion, filling rate, and the deformation properties of the tank, become very important for the calculation.
Author (ESA)

N82-28684# Statens Provningsanstalt, Boraas (Sweden). Div. of Building Physics.
TEST METHODS FOR PLASTIC WINDOWS
Per Ingvar Sandberg and Hans Brolin 1981 12 p
(SP-A-82:02) Avail: NTIS HC A02/MF A01

A test program for determining whether vinyl plastic windows are suitable for the Nordic climate is outlined. Airtightness, raintightness, security against wind loading, and resistance to temperature changes are tested. Thermal and fire resistance are specified. Impact strength, dimensional stability at elevated temperature, weather resistance and aging effects on frame and casement profiles are included. Creep testing, thermal stability, Vicat point and IR absorption are discussed.
Author (ESA)

N82-28685# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
PREDICTION OF FATIGUE CRACK GROWTH RATES UNDER VARIABLE LOADING USING A SIMPLE CRACK CLOSURE MODEL

A. U. deKoning and H. H. vanderLinden Apr. 1980 45 p refs Presented at 11th ICAF Symp., Noordwijkerhout, Netherlands, 20-22 May 1981
(Contracts NIVR-1777; NIVR-1822; NIVR-1823)
(NLR-MP-81023-U) Avail: NTIS HC A03/MF A01

A model which predicts fatigue crack growth rates in aluminum alloys subjected to flight service loading is presented. The model is based on an approximate description of the crack opening behavior and was applied successfully in an analysis of effects of crack growth acceleration and retardation observed experimentally under variable amplitude loading. The model describes effects of the plane strain to plane stress transition and of relatively high overloads on crack growth rate of the crack. Author (ESA)

N82-28686# National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
STRESS CORROSION CRACK INITIATION TESTING OF HIGH STRENGTH ALUMINUM ALLOYS USING TUNING FORK TYPE SPECIMENS
L. Schra and H. N. Huisman Apr. 1981 70 p refs
(Contract NIVR-1868)
(NLR-TR-81053-U) Avail: NTIS HC A04/MF A01

The applicability of various corrosive environments for stress corrosion crack initiation testing was investigated. Specimens underwent standard constant load, constant total strain, and constant strain rate tests. Atmospheric exposure effects, immersion in 3.5% NaCl solution at 61% relative humidity, and testing in salt chromate solutions were studied. Results show that salt-chromate solutions inhibit general corrosion effectively, but do not result in cracking or, at a low pH value, lead to unrealistic ranking of materials as to stress corrosion cracking. Material behavior experienced under atmospheric conditions is reflected very well by alternate immersion testing in a salt solution. Pickling pretreatment causes a different degree of attack in different alloys and results in substantially shorter lifetimes for alternate immersion testing. Author (ESA)

N82-28687# Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium). Section: Construction Metallique.
EXTERNAL LOADS ON NOZZLES IN CYLINDRICAL SHELLS
Progress Report
Joris Decock Apr. 1982 38 p refs Sponsored by Inst. pour l'Encouragement de la Recherche Scientifique dans l'Industrie et l'Agriculture
(CRIF-MT-146; PR-4) Avail: NTIS HC A03/MF A01

Results of experimental stress analysis and fatigue tests on cylindrical shell-nozzle models with ratio D/T = 20 and d/D between 0.1 and 1 are presented. Shells and nozzles were made from seamless tubes. Radial inward load, longitudinal moment, circumferential moment, and internal pressure were examined in static and cyclic loading tests. Maximum local moment occurs in the transverse plane of symmetry in circumferential direction for a circumferential moment or a radial load. Author (ESA)

N82-28478# Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.
DAMPING IN STRUCTURAL JOINTS
C. F. Beards *In* Shock and Vibration Information Center The Shock and Vibration Digest, Volume 14, No. 6 Jun. 1982 p 9-11 refs (For primary document see N82-28476 19-31) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375; $140.00/annual CSCL 20/11

42 GEOSCIENCES (GENERAL)

N82-28688# Geological Survey, Washington, D. C.
BIOTA AND BIOLOGICAL PRINCIPLES OF THE AQUATIC ENVIRONMENT
Phillip E. Greeson, ed. 1982 52 p refs
(CIRC-848-A) Avail: NTIS HC A04/MF A01

The first of several compilations of briefing papers on water quality prepared by the U.S. Geological Survey is presented. Each briefing paper is prepared in a simple, nontechnical, easy to understand manner. This U.S. Geological Survey Circular contains papers on selected biota and biological principles of the aquatic environment. Briefing papers are included on Why biology in water quality studies?, Stream biology, Phytoplankton, Periphyton, Drift organisms in streams, Family Chironomidae (Diptera), Influences of water temperature on aquatic biota, and Stream channelization: Effects on stream fauna. Author

N82-28689# Geological Survey, Washington, D. C.
US GEOLOGICAL SURVEY ACTIVITIES, FISCAL YEAR 1981
1981 165 p refs
(CIRC-875) Avail: NTIS HC A08/MF A01

Activities in Alaska, Mount St. Helens, leasing and regulatory procedure, coal, royalty management, water data telemetry, acid rain, hazardous wastes, oil and gas resources, and digital cartography are reviewed. Chemical and nuclear wastes and petroleum exploration in Alaska are discussed. Management issues are addressed. Mapping activities are reported. Water resources, conservation, and earth sciences, are also reviewed. N.W.

N82-28690*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
BASELINE MONITORING USING AIRCRAFT LASER RANGING
W. B. Krabill, F. E. Hoge, and C. F. Martin Jun. 1982 28 p refs
(NASA-TM-73298; NAS 1.15:73298) Avail: NTIS HC A03/MF A01 CSCL 08B

The use of aircraft laser ranging for the determination of baselines between ground based retroreflectors was investigated via simulations and with tests at Wallops Flight Center using the Airborne Oceanographic Lidar (AOL) on the Wallops C-54 aircraft ranging to a reflector array deployed around one of the Wallops runways. The aircraft altitude and reflector spacing were chosen on the basis of scaled down modeling of spacecraft tracking from 1000 km of reflectors separated by some 52 km, or of high altitude (10 km) aircraft tracking of reflectors separated by some 500 m. Aircraft altitudes flown for different passes across the runway reflector array varied from 800 m to 1350 m, with 32 reflectors deployed over an approximately 300 m x 500 m ground pattern. The AOL transmitted 400 pulses/sec with a scan rate of 5/sec in a near circular pattern, so that the majority of the pulses were reflected by the runway surface or its environs rather than by retroreflectors. The return pulse characteristics clearly showed the high reflectivity of portions of the runway, with several returns indistinguishable in amplitude from reflector returns. For each pass across the reflector field, typically six to ten reflector hits were identified, consistent with that predicted by simulations and the observed transmitted elliptical pulse size. Author

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography*.

N82-28691# RAND Corp., Santa Monica, Calif.
A RAND NOTE: POLICY ANALYSIS OF WATER MANAGEMENT FOR THE NETHERLANDS. VOLUME 3: SCREENING OF EUTROPHICATION CONTROL TACTICS
J. C. DeHaven Aug. 1981 111 p refs Sponsored by Netherlands Rijkswaterstaat
(RAND/N-1500/3-NETH) Copyright. Avail: Issuing Activity

A number of different eutrophication control tactics suggested by the literature or by particular Dutch situations are described and then evaluated by estimating their potential effectiveness, cost, and adverse effects in Dutch waters. The techniques are classified most generally in terms of those which restrict nutrient and sediment inputs and those which are in-water control methods such as mechanical and habitat manipulation (harvesting, dredging, etc.), nutrient inactivation, nutrient balancing, and

biological and chemical controls. Only those techniques which appear sufficiently attractive to merit further investigation in the Dutch environment are laborated. A.R.H.

N82-28692# RAND Corp., Santa Monica, Calif.
A RAND NOTE: POLICY ANALYSIS OF WATER MANAGEMENT FOR THE NETHERLANDS. VOLUME 16: COSTS FOR INFRASTRUCTURE TACTICS
R. L. Petruschell, T. Repnau, J. W. Pulles, and M. A. Veen Jul. 1981 248 p refs Sponsored by Netherlands Rijkswaterstaat
(RAND/N-1500/16-NETH) Copyright. Avail: Issuing Activity

Cost estimates are documented for nearly 100 proposed water management infrastructures tactics. Tactic costs involve building or modifying components of a complex system of rivers, canals, locks, pumping stations, pipelines, dikes, sluices, weirs, dams, salt intrusion devices, and inlet and outlet constructions that allow the country to control the distribution of water for agriculture, shipping, industry, and to provide safety from flooding. Investment and operating costs must also be considered. A.R.H.

N82-28693# RAND Corp., Santa Monica, Calif.
A RAND NOTE: POLICY ANALYSIS OF WATER MANAGEMENT FOR THE NETHERLANDS. VOLUME 17: FLOOD SAFETY MODEL FOR THE IJSSEL LAKES
T. F. Kirkwood, A. F. Abrahamse, and T. Repnau May 1981 54 p refs Sponsored by Netherlands Rijkswaterstaat
(RAND/N-1500/17-NETH) Copyright. Avail: Issuing Activity

Among the water management tactics being considered raising the summer water levels of the Ijsselmeer and Markermeer lakes and changing from winter to summer water levels at an earlier date. These tactics which are intended to increase the freshwater storage capacity of the lakes, pose questions regarding safety. The safety hazard involved is assessed by estimating the probability that the higher waves will overtop the dikes. The approach used to develop the filling model for the Ijsselmeer and to determine the exceedance frequency curves for water levels and winds are described. The dike safety model is considered from the points of view of wind effects, wind velocities for overtopping, and estimation of the probability of dike overtopping. Application of the model to finding sluice capacity and its reliability in determining dike safety are discussed. Modeling inaccuracies and the effect of correlation are examined. A.R.H.

N82-28694# RAND Corp., Santa Monica, Calif.
A RAND NOTE: POLICY ANALYSIS OF WATER MANAGEMENT FOR THE NETHERLANDS. VOLUME 18: SEDIMENTATION AND DREDGING COST MODELS
T. F. Kirkwood May 1981 47 p refs Sponsored by Netherlands Rijkswaterstaat
(RAND/N-1500/18-NETH) Avail: Issuing Activity

The diversion of water from a river that is transportating sand results in reduced flow velocity and an increase in the rate at which the sediment is deposited. The sandbar that develops makes it necessary for ships to carry less than their normal cargo in times of low water. Sedimentation, dredging cost, and sedimentation loss function models are described which were developed to determine whether dredging or operation with reduced cargo results in the lower cost. The costs when different water management techniques are used are also estimated. A.R.H.

N82-28695* National Aeronautics and Space Administration, Washington, D. C.
EARTH RESOURCES: A CONTINUING BIBLIOGRAPHY WITH INDEXES, ISSUE 33
Apr. 1982 100 p
(NASA-SP-7041(33); NAS 1.21:7011(33)) Avail: NTIS HC $10.50 CSCL 05B

This bibliography list 436 reports, articles, and other documents introduced into the NASA Scientific and Technical Information System. Emphasis is placed on the use of remote sensing and geophysical instrumentation in spacecraft and aircraft to survey and inventory natural resources and urban areas. Subject matter is grouped according to agriculture and forestry, environmental changes and cultural resources, geodesy and cartography, geology and mineral resources, hydrology and water management, data processing and distribution sytems, instrumentation and sensors, and economic analysis. S.L.

N82-28696 Royal Aircraft Establishment, Farnborough (England).
THE USE OF TERRAIN HEIGHT INFORMATION FOR IMPROVING THE ACCURACY OF CLASSIFICATION OF LANDSAT DATA
P. A. Roberts Jan. 1982 19 p refs
(RAE-TM-SPACE-297; BR82645) Copyright. Avail: Issuing Activity

An algorithm that transforms digitized height contours into an equispaced grid of points is presented. A method which uses this height matrix to derive the magnitude and direction of the slope of the terrain is described. This information is used to calculate the variation in direct solar illumination over an area. Height, slope, and variation in direct solar illumination are represented as gray tone images, assigning pixel value according to intensity. Aspect is displayed by assigning a value of 0 deg to a zero image intensity (flat terrain) and 360 deg to maximum intensity. Classification of multispectral LANDSAT imagery, using terrain parameters as extra image planes, or by modifying pixel intensities in the LANDSAT image, was studied. Results for a wooded area are inconclusive because of: lack of ground truth data for verifying classifications; the nature of the terrain (not rugged enough); and the restricted area of the sample. Author (ESA)

N82-28697# RAND Corp., Santa Monica, Calif.
THE EFFECTS OF LEASE SIZE ON YIELDS FROM OIL SHALE SURFACE MINES
R. Y. Pei and D. S. Rubenson Mar. 1982 36 p refs Sponsored by DOE
(RAND/N-1798-DOE) Avail: NTIS HC A03/MF A01

The effects of lease size and waste disposal policy on the amount of oil shale that can be recovered from an open pit mine are examined. Process facilities and waste disposal are considered, and the effects of federal leasing policy on the long-term potential of oil shale are assessed. Geometrical analysis of an open pit mine provided an understanding of the relation between lease size and resource recovery. The amount of recoverable oil shale was found to be limited to no more than 20 percent of the resource in place. Author

N82-28698*# Environmental Systems Research Inst., Redlands, Calif.
INVENTORY OF AVAILABLE DATA ELEMENTS FOR THE SAN BERNARDINO, CALIFORNIA REGION Interim Report
Jerald Christenson and Russell Michel Mar. 1981 50 p refs
(Contract NAS2-10741)
(NASA-CR-166354; NAS 1.26:166354) Avail: NTIS HC A03/MF A01 CSCL 08F

Elements of data sets that are available to be integrated for the San Bernardino vertical data integration project are given. Each of the data sets has specified for it the ownership, validity, accuracy and technical requirements for integration. R.J.F.

N82-28699*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PROCEEDINGS OF THE NASA WORKSHOP ON REGISTRATION AND RECTIFICATION
Nevin A. Bryant, ed. 1 Jun. 1982 535 p refs Workshop held in Leesburg, Va., 17-19 Nov. 1981
(Contract NAS7-100)
(NASA-CR-169133; JPL-PUB-82-23; NAS 1.26:169133) Avail: NTIS HC A23/MF A01 CSCL 08B

Issues associated with the registration and rectification of remotely sensed data. Near and long range applications research tasks and some medium range technology augmentation research areas are recommended. Image sharpness, feature extraction, inter-image mapping, error analysis, and verification methods are addressed. For individual titles, see N82-28700 through N82-28739.

N82-28700*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
WORKSHOP RATIONALE
Frederick C. Billingsley *In its* Proc. of the NASA Workshop on

Registration and Rectification 1 Jun. 1982 p 13-20 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The problems involved in processing remotely sensed data are defined within the contex of the total information system structure. The correlation of various data sets through georeferencing and cataloging is emphasized along with geometric rectification. The sources and types of possible geometric errors are outlined. M.G.

N82-28701*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REPORT OF SUBPANEL ON IMAGE SHARPNESS
In its Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 22-26 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Factors effecting the sharpness of images acquired by multispectral scanners, synthetic aperture radar, thermal infrared sensors, and multispectral linear arrays are defined. Factors associated with the sensor include the atmospheric blur/scatter function, the point spread function of the sensor, the sensor aperture, the filter characteristics, and the sampling rate and quatization effects. Several research tasks are proposed which include investigating the use of optical prefilters which include investigating the use of optical prefilters and the relationships of the instantaneous field of view (aperture width) on the performance of geocorrelation systems. M.G.

N82-28702*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REPORT OF SUBPANEL ON FEATURE EXTRACTION
In its Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 27-32 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The state of knowledge in feature extraction for Earth resource observation systems is reviewed and research tasks are proposed. Issues in the subpixel feature estimation problem are defined as: (1) the identification of image models which adequately describe the data and the sensor it is using; (2) the construction of local feature models based on those image models; and (3) the problem of trying to understand these effects of preprocessing on the entire process. The development of ground control point (GCP) libraries for automated selection presents two concerns. One is the organization of these GCP libraries for rectification problems, i.e., the problems of automatically selecting by computer the specific GCP's for particular registration tasks. Second is the importance of integrating ground control patterns in a data base management system, allowing interface to a large number of sensor image types with an automatic selection system. The development of data validation criteria for the comparison of different extraction techniques is also discussed. M.G.

N82-28703*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REPORT OF SUBPANEL ON INTER-IMAGE MATCHING
In its Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 33-37 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Research needs in the area inter-image matching for remote Earth observation systems are defined. Correlation considerations include types of correlation algorithms, preprocessing techniques, limits on subpixed accuracy, relief and atmospheric refraction effects, evaluation of success rate, and evaluation of accuracy. Also recommended are investigations of the interaction of inter-image matching procedures and selection of ground control points for a given sensor; global multisensor control point library feasibility; multiple control point considerations; centralized processing systems; and user systems. M.G.

N82-28704*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REPORT ON THE SUBPANEL ON REMAPPING PROCEDURES
In its Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 38-42 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Problems associated with remapping procedures are defined and research tasks are proposed. It is noted that the remapping/rectification process could be significantly aided through engineering systems improvements in attitude control, with subsequent improvement in spacecraft ephemeris modeling accuracy. There is a need for state-of-the-art technology assessments prior to initiation of major programs, and the high potential return from well formulated testing of algorithms on selected data sets of actual and synthetic imagery. In addition, there is a need for tasks that incorporate standard photogrammetric methodology and formulas and that more fully utilize platform and calibration data from current and proposed sensors to reproject digital imagery. The impact of improved platform stability and integration of global positioning system measurements on reduced ground segment processing needs to be critically assessed. Also highlighted is the need for a substantial effort in the development of remapping software and systems that are modular and transportable. M.G.

N82-28705*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REPORT OF THE SUBPANEL ON RESAMPLING FUNCTIONS
In its Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 43-45 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The state of the art and anticipated requirements for resampling in applications of remote sensing are examined. It is noted that the wide range of potential applications and expanded needs for resampling versatility in new imaging sensors leads to a concern for creating standardized test data sets and ground training sites. Several research areas are defined including the development of (1) a theory for defining an input psf of an instrument such that upon resampling of the processed data into the desired output grid the radiometric and geometric properties are a best estimate of the true upwelling radiances; (2) algorithms for estimating missing data or for ignoring missing data; (3) optimal resampling functions; (4) standard data sets; and (5) merit functions for assessing resampling techniques. M.G.

N82-28706*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REPORT OF THE SUBPANEL ON ERROR CHARACTERIZATION AND ERROR BUDGETS
In its Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 46-59 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The state of knowledge of both user positioning requirements and error models of current and proposed satellite systems is reviewed. In particular the error analysis models for LANDSAT D are described. Recommendations are given concerning the geometric error model for the thematic mapper; interactive user involvement in system error budgeting and modeling and verification on real data sets; and the identification of a strawman mission for modeling key error sources. M.G.

N82-28707*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
REPORT OF THE SUBPANEL ON METHODS OF VERIFICATION
In its Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 60-67 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

A program to improve the state of understanding and of the meaning of verification and the application of verification procedures to a variety of sensor systems is recommended. The program would involve an experimental hands-on data demonstration and evaluation of those procedures in a controlled test bed experiment. M.G.

N82-28708*# Department of Agriculture, Washington, D.C. Statistical Reporting Service.

USDA REGISTRATION AND RECTIFICATION REQUIREMENTS

Rich Allen *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jul. 1982 p 69-76 refs (For primary document see N82-28699 19-43)

Avail: NTIS HC A23/MF A01 CSCL 08B

Some of the requirements of the United States Department of Agriculture for accuracy of aerospace acquired data, and specifically, requirements for registration and rectification of remotely sensed data are discussed. Particular attention is given to foreign and domestic crop estimation and forecasting, forestry information applications, and rangeland condition evaluations. M.G.

N82-28709*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

NEEDS FOR REGISTRATION AND RECTIFICATION OF SATELLITE IMAGERY FOR LAND USE AND LAND COVER AND HYDROLOGIC APPLICATIONS

Leonard Gaydos *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 77-83 refs (For primary document see N82-28699 19-43)

Avail: NTIS HC A23/MF A01 CSCL 08B

The use of satellite imagery and data for registration of land use, land cover and hydrology was discussed. Maps and aggregations are made from existing the data in concert with other data in a geographic information system. Basic needs for registration and rectification of satellite imagery related to specifying, reformatting, and overlaying the data are noted. It is found that the data are sufficient for users who must expand much effort in registering data. E.A.K.

N82-28710*# Geological Survey, Flagstaff, Ariz.

REGISTRATION AND RECTIFICATION NEEDS OF GEOLOGY

Pat S. Chavez, Jr. *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 84-95 (For primary document see N82-28699 19-43)

Avail: NTIS HC A23/MF A01 CSCL 08B

Geologic applications of remotely sensed imaging encompass five areas of interest. The five areas include: (1) enhancement and analysis of individual images; (2) work with small area mosaics of imagery which have been map projection rectified to individual quadrangles; (3) development of large area mosaics of multiple images for several counties or states; (4) registration of multitemporal images; and (5) data integration from several sensors and map sources. Examples for each of these types of applications are summarized. E.A.K.

N82-28711*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

DATA REGISTRATION AND INTEGRATION REQUIREMENTS FOR SEVERE STORMS RESEARCH

John T. Dalton *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 97-104 refs (For primary document see N82-28699 19-43)

Avail: NTIS HC A23/MF A01 CSCL 08B

Severe storms research is characterized by temporal scales ranging from minutes (for thunderstorms and tornadoes) to hours (for hurricanes and extra-tropical cyclones). Spatial scales range from tens to hundreds of kilometers. Sources of observational data include a variety of ground based and satellite systems. Requirements for registration and intercomparison of data from these various sources are examined and the potential for operational forecasting application of techniques resulting from the research is discussed. The sensor characteristics and processing procedures relating to the overlay and integrated analysis of satellite and surface observations for severe storms research are reviewed. E.A.K.

N82-28712*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

OCEANOGRAPHIC SATELLITE REMOTE SENSING: REGISTRATION, RECTIFICATION, AND DATA INTEGRATION REQUIREMENTS

David A. Nichols *In its* Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 105-111 refs (For primary document see N82-28699 19-43)

Avail: NTIS HC A23/MF A01 CSCL 08B

The problem of data integration in oceanography is discussed. Recommendations are made for technique development and evaluation, understanding requirements, and packaging techniques for speed, efficiency and ease of use. The primary satellite sensors of interest to oceanography are summarized. It is concluded that imaging type sensors make image processing an important tool for oceanographic studies. E.A.K.

N82-28713*# General Electric Co., Philadelphia, Pa. Space Center.

SPACEBORNE SCANNER IMAGING SYSTEM ERRORS

Arun Prakash *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 113-129 refs (For primary document see N82-28699 19-43)

Avail: NTIS HC A23/MF A01 CSCL 08B

The individual sensor system design elements which are the priori components in the registration and rectification process, and the potential impact of error budgets on multitemporal registration and side-lap registration are analyzed. The properties of scanner, MLA, and SAR imaging systems are reviewed. Each sensor displays internal distortion properties which to varying degrees make it difficult to generate on orthophoto projection of the data acceptable for multiple pass registration or meeting national map accuracy standards and is also affected to varying degrees by relief displacements in moderate to hilly terrain. Nonsensor related distortions, associated with the accuracy of ephemeris determination and platform stability, have a major impact on local geometric distortions. Platform stability improvements expected from the new multi mission spacecraft series and improved ephemeris and ground control point determination from the NAVSTAR/global positioning satellite systems are reviewed. E.A.K.

N82-28714*# Santa Barbara Research Center, Goleta, Calif.

THEMATIC MAPPER PERFORMANCE

Jack Engle *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 130-137 (For primary document see N82-28699 19-43)

Avail: NTIS HC A23/MF A01 CSCL 08B

The thematic mapper primarily and its difference from MSS is reviewed. The TM has 30 meter resolution and the MSS has 80 meter resolution. This provides on agriculture an ability to accurately classify 10 acre fields with the TM versus 70 acre fields with the MSS data. There are six reflected light bands in the thematic mapper. Two bands are a new spectral region out in the IR, the shortwave IR region, as opposed to MSS's four reflected light bands. Four thematic mapper reflected light bands in the visible portion of the spectrum are designated to enhance the classification capability. The TM has better signal-to-noise ratio performance and radiometric sensitivity. The scan efficiency is increased through the use of bidirectional scanning, which gives a scan efficiency of 85% versus 45% with the multispectral scanner and more detectors per band. Greater encoding resolurion is obtained in the multiplexer, 8 bit resolution versus 6 bits for MSS. E.A.K.

N82-28715*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

SCANNER IMAGING SYSTEMS, AIRCRAFT

Stephen G. Ungar *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 138-152 (For primary document see N82-28699 19-43)

Avail: NTIS HC A23/MF A01 CSCL 08B

The causes and effects of distortion in aircraft scanner data are reviewed and an approach to reduce distortions by modelling the effect of aircraft motion on the scanner scene is discussed. With the advent of advanced satellite borne scanner systems, the geometric and radiometric correction of aircraft scanner data has become increasingly important. Corrections are needed to reliably simulate observations obtained by such systems for purposes of evaluation. It is found that if sufficient navigational information is available, aircraft scanner coordinates may be related very precisely to planimetric ground coordinates. However, the potential for a multivalue remapping transformation (i.e., scan lines crossing each other), adds an inherent uncertainty, to any

radiometric resampling scheme, which is dependent on the precise geometry of the scan and ground pattern. E.A.K.

N82-28716*# National Aeronautics and Space Administration, Washington, D. C.
MLA IMAGING SYSTEMS
Ken J. Ando *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 153-162 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The development of the enabling technology and instrument/mission definition phase for the application of advanced solid state sensors for future experimental remote sensing missions is discussed. The development of focal planes, instrument concept/design, mission studies, and service requirements and an imaging spectrometer technology and a Shuttle sortie mission definition are outlined. E.A.K.

N82-28717*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
GEOMETRIC AND REDIAMETRIC DISTORTION IN SPACE-BORNE SAR IMAGERY
J. C. Curlander *In its* Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 163-197 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Distortions inherent on synthetic aperture radio (SAR) imagery and the development to date of unsupervised postprocessing rectification techniques are described. The geometric distortion can be divided into two categories: (1) distortion derived from the radar viewing geometry, this includes such effects as ground range nonlinearities, radar foreshortening and radar layover; (2) distortion introduced during the data processing, these distortions result from approximations made during the correlation such as in estimation of the target phase history, or compensation for the earth rotation. The processor induced distortions depends on the specific correlation algorithm used for image formation. The effects are addressed on the image product resulting from assumptions during the processing and it specifically considers distortions inherent in digital imagery produced by the digital image processor. E.A.K.

N82-28718*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPACECRAFT INDUCED ERROR SOURCES
Howard S. Heuberger *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 198-201 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The attitude control and measurement systems aboard the LANDSAT 2 and D satellites are described and associated errors are discussed. Also, the ephemeris errors from various tracking systems are examined. Use of the Global Positioning System and improved attitude control instruments is expected to greatly reduce the errors in LANDSAT D in comparison with previous LANDSATS. M.G.

N82-28719*# Aerospace Corp., Los Angeles, Calif.
NAVSTAR/GLOBAL POSITIONING SYSTEM
Mohan Ananda *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 202-206 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 17G

The Global Positioning System (GPS) was developed to provide highly precise position, velocity, and time information to users anywhere in the area of the Earth and at any time. The GPS, when fully operational, will consist of 18 satellites in six orbital planes. Any GPS user, by receiving and processing the radio signals from the satellite network can instantaneously determine navigation information to an accuracy of about 15 m in position and 0.1 m/s in velocity. The GPS is compared with other systems such as Loran-C, Omega, TACAN and Transit. T.M.

N82-28720*# National Oceanic and Atmospheric Administration, Rockville, Md. Horizontal Network Div.
GEODETIC CONTROL
John Gergen *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 208-214 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08E

The U.S. Horizontal Network is described for the years 1900 and 1931, and then compared with the current status of the network. North American Datum for 1946 and 1981 are also described. Relative accuracy between directly connected adjacent points were reviewed along with absolute accuracy. T.M.

N82-28721*# Georgia Univ., Athens.
MAP ACCURACY REQUIREMENTS: THE CARTOGRAPHIC POTENTIAL OF SATELLITE IMAGE DATA
Roy Welch *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 215-223 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Cartographic products fall into a variety of classes: topographic maps that are concerned with planimetric information and elevations or heights; thematic maps, which might be used for geology, vegetation, water, or to display these subjects; digital elevation maps that would be produced from digital terrain data; and finally image maps. In terms of satellite applications, thematic maps and image maps are emphasized. The objectives are to consider, first, if resolution will be adequate for the identification of control and for the compilation of map products. Then, second, to define map accuracy standards and to determine the potential for meeting these standards with image data from the film camera, scanner and linear array systems of the 1980s. T.M.

N82-28722*# Geological Survey, Reston, Va.
MAP PROJECTIONS FOR LARGER-SCALE MAPPING
John P. Snyder *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 224-241 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

For the U.S. Geological Survey maps at 1:1,000,000-scale and larger, the most common projections are conformal, such as the Transverse Mercator and Lambert Conformal Conic. Projections for these scales should treat the Earth as an ellipsoid. In addition, the USGS has conceived and designed some new projections, including the Space Oblique Mercator, the first map projection designed to permit low-distortion mapping of the Earth from satellite imagery, continuously following the groundtrack. The USGS has programmed nearly all pertinent projection equations for inverse and forward calculations. These are used to plot maps or to transform coordinates from one projection to another. The projections in current use are described. T.M.

N82-28723*# Purdue Univ., Lafayette, Ind.
A DISCUSSION OF IMAGE SHARPNESS
Paul Anuta *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 243-250 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The image sharpness problem is discussed in terms of a scene which is viewed by a sensor. The sensor has some sort of function which is a nonpoint observing function, and it's a function that gathers energy from some region around a point in the scene. That energy is integrated and is contributed to each point or each sample that is taken of the scene. The samples become the pixels, and the pixels are assembled together into the digital image. Each one has some blurr or some of what is called the point's spread function creating the value of information or data that is seen in each pixel. Then the sensor and electronic part of the system acts on that signal out of the sensor and perhaps adds more blurring, more loss of resolution to the system. Finally, sampling and quantization of the data produce their effects. The signal is sampled at some rate and the digital image is created from that. The sampling or digitizing process puts the continuous voltage into a number of discrete binary levels, and another error is introduced there. T.M.

N82-28724*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
THE DIGITAL STEP EDGE
Robert M. Haralick *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 251-303 refs

(For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The facet model was used to accomplish step edge detection. The essence of the facet model is that any analysis made on the basis of the pixel values in some neighborhood has its final authoritative interpretation relative to the underlying grey tone intensity surface of which the neighborhood pixel values are observed noisy samples. Pixels which are part of regions have simple grey tone intensity surfaces over their areas. Pixels which have an edge in them have complex grey tone intensity surfaces over their areas. Specially, an edge moves through a pixel only if there is some point in the pixel's area having a zero crossing of the second directional derivative taken in the direction of a non-zero gradient at the pixel's center. To determine whether or not a pixel should be marked as a step edge pixel, its underlying grey tone intensity surface was estimated on the basis of the pixels in its neighborhood. Author

N82-28725*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
INTER-IMAGE MATCHING
Robert H. Wolfe, Jr. (IBM, Houston) and Richard D. Juday *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 304-336 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Interimage matching is the process of determining the geometric transformation required to conform spatially one image to another. In principle, the parameters of that transformation are varied until some measure of some difference between the two images is minimized or some measure of sameness (e.g., cross-correlation) is maximized. The number of such parameters to vary is faily large (six for merely an affine transformation), and it is customary to attempt an a priori transformation reducing the complexity of the residual transformation or subdivide the image into small enough match zones (control points or patches) that a simple transformation (e.g., pure translation) is applicable, yet large enough to facilitate matching. In the latter case, a complex mapping function is fit to the results (e.g., translation offsets) in all the patches. The methods reviewed have all chosen one or both of the above options, ranging from a priori along-line correction for line-dependent effects (the high-frequency correction) to a full sensor-to-geobase transformation with subsequent subdivision into a grid of match points, T.M.

N82-28726*# Purdue Univ., Lafayette, Ind. School of Civil Engineering.
PHOTOGRAMMETRIC ASPECTS OF REMAPPING PROCEDURES
Edward M. Mikhail *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 337-358 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Photogrammetric control generation is discussed. Techniques in remote sensing data reduction are described. Emphasis is placed on methods of rectification of aerial photography and frame photography. Examples of multispectral band scanner data that were processed are presented. T.M.

N82-28727*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
COMPUTATIONAL ASPECTS OF REMAPPING DIGITAL IMAGERY
Albert L. Zobrist *In its* Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 358-370 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

One of the advantages of automated cartography is that map data stored in the digital computer can be plotted or displayed at any scale or projection by recomputing the coordinates of the data. This is especially easy in the case of vector (graphics) data but in the case of digital image (raster) data, remapping is a more difficult operation. Examples of the remapping of digital imagery would include rectification of a LANDSAT MSS to an orthographic or Mercator projection, warping of one image to register with another, or rotation, scale, or aspect changes of a digital image. Use of general purpose computers and array processors for this task will be covered. Data processing error will be discussed for each modelling/warping approach. T.M.

N82-28728*# Environmental Research Inst. of Michigan, Ann Arbor. Applications Div.
A QUANTITATIVE ASSESSMENT OF RESAMPLING ERRORS
Robert H. Dye *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 371-376 ref (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Applications associated with digital geographic imagery are subject to great diversity in required cell size, cartographic projection, etc. The need for resampling remote sensing scaner data is evident in all but the most undemanding cases. It is shown that proper resampling of such data is dependent in important ways on the detailed knowledge of the original scanner's effective point-spread function and to the desired point-spread function of resampled data. When both of these are known, it is relatively straightforward to compute the resampling coefficients which do the best job of approximating the shape and position of the synthesized point-spread function. The resulting synthesized psf are compared with an ideal psf located at various interpixel positions and any differences observed as errors. T.M.

N82-28729*# General Electric Co., Philadelphia, Pa. Space Center.
GEOMETRIC ERROR CHARACTERIZATION AND ERROR BUDGETS
Eric Beyer *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 377-386 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Procedures used in characterizing geometric error sources for a spaceborne imaging system are described using the LANDSAT D thematic mapper ground segment processing as the prototype. Software was tested through simulation and is undergoing tests with the operational hardware as part of the prelaunch system evaluation. Geometric accuracy specifications, geometric correction, and control point processing are discussed. Cross track and along track errors are tabulated for the thematic mapper, the spacecraft, and ground processing to show the temporal registration error budget in pixel (42.5 microrad) 90%. A.R.H.

N82-28730*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
GEOMETRIC VERIFICATION
Gerald J. Grebowsky *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 387-391 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Present LANDSAT data formats are reviewed to clarify how the geodetic location and registration capabilities were defined for P-tape products and RBV data. Since there is only one geometric model used in the master data processor, geometric location accuracy of P-tape products depends on the absolute accuracy of the model and registration accuracy is determined by the stability of the model. Due primarily to inaccuracies in data provided by the LANDSAT attitude management system, desired accuracies are obtained only by using ground control points and a correlation process. The verification of system performance with regards to geodetic location requires the capability to determine pixel positions of map points in a P-tape array. Verification of registration performance requires the capability to determine pixel positions of common points (not necessarily map points) in 2 or more P-tape arrays for a given world reference system scene. Techniques for registration verification can be more varied and automated since map data are not required. The verification of LACIE extractions is used as an example. A.R.H.

N82-28731*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
MISREGISTRATION'S EFFECTS ON CLASSIFICATION AND PROPORTION ESTIMATION ACCURACY
Richard D. Juday and Forrest Hall *In* JPL Proc. of the NASA

Workshop on Registration and Rectification 1 Jun. 1982 p 393-400 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The estimates of crop type and acreage are undertaken in the AgRISTARS program by registering multiple date acquisitions of small subareas of LANDSAT scenes (termed segments), and applying multispectral analysis to them. An important contribution to errors in classification and acreage estimates is misregistration between multiple acquisitions. The formula used to express this relationship is given and the operations applied are so shown in diagrams. The taking of a LANDSAT feature vector and the derivation of the brightness and greeness are illustrated. It is shown that for any given sensor IFOV geometry, typical populations of fields can be derived and histograms can be plotted of the number of fields against field size according to ground truth. As a function of the resolution element, the IFOV of the sensor can draw the proportion of pure pixels in a given crop. Because the thematic mapper has a smaller resolution, the proportion of pixels that are pure in any given area will be larger. A.R.H.

N82-28732*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DATA VS. INFORMATION: A SYSTEM PARADIGM
Frederick C. Billingsley *In its* Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 401-409 (For primary document see N82-28699 19-43)
(Contract NAS7-100)
Avail: NTIS HC A23/MF A01 CSCL 08B

The data system designer requires data parameters, and is dependent on the user to convert information needs to these data parameters. This conversion will be done with more or less accuracy, beginning a chain of inaccuracies which propagate through the system, and which, in the end, may prevent the user from converting the data received into the information required. The concept to be pursued is that errors occur in various parts of the system, and, having occurred, propagate to the end. Modeling of the system may allow an estimation of the effects at any point and the final accumulated effect, and may prove a method of allocating an error budget among the system components. The selection of the various technical parameters which a data system must meet must be done in relation to the ability of the user to turn the cold, impersonal data into a live, personal decision or piece of information. A.R.H.

N82-28733*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
MODELING MISREGISTRATION AND RELATED EFFECTS ON MULTISPECTRAL CLASSIFICATION
Frederick C. Billingsley *In its* Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 410-427 refs (For primary document see N82-28699 19-43)
(Contract NAS7-100)
Avail: NTIS HC A23/MF A01 CSCL 08B

Any noise in measurements (due to the scene, sensor, or the analog to digital process) causes a finite fraction of measurements to fall outside of the classification limits. For field boundaries, where the misregistration effects are felt, the misregistration causes the border in a given (set of) band(s) to be closer than expected to a given pixel, so that the mixed materials in the pixels cause additional pixels to fall outside of the class limits. Considerations of the transient distance involved in the difference in brightness between adjacent fields, when scaled to 'per pixel', allow the estimation of the width of the border zones. The entire problem is then scaled to field sizes to allow estimation of the global effects. This approach allows the estimation of the accuracy of multispectral classification which might be expected for field interiors, the useful number of quantization bits, and one set of criteria for an unbiased classifier. A.R.H.

N82-28734*# Geological Survey, Reston, Va.
AN AUTOMATED MAPPING SATELLITE SYSTEM
Alden P. Colvocoreses *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 428-443 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Topographic maps are compiled by manually operated stereoplotters that recreate the geometry of two wide-angle overlapping stereo frame photographs. Continuous imaging systems such as strip cameras, electro-optical scanners, or linear arrays of detectors (push brooms) can also create stereo coverage from which topography can be compiled; however, the instability of an aircraft in the atmosphere makes this approach impractical. The benign environment of space permits a satellite to orbit the Earth with very high stability as long as no local perturbing forces are involved. Solid-state linear-array sensors have no moving parts and create no perturbing force on the satellite. Digital data from highly stabilized stereo linear arrays are amenable to simplified processing to produce both planimetric imagery and elevation data. A proposed satellite, called MAPSAT, could accomplish automated mapping in near real time. Image maps as large as 1:50,000 scale with contours as close as 20-m interval may be produced from MAPSAT data. A.R.H.

N82-28735*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONCEPT FOR A MULTIPLE RESOLUTION PUSHBROOM SENSOR
Frederick C. Billingsley *In its* Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 444-449 refs (For primary document see N82-28699 19-43)
(Contract NAS7-100)
Avail: NTIS HC A23/MF A01 CSCL 08B

A general purpose pushbroom sensor will have parameters determined by the needs of the majority of potential users. These parameters may not satisfy the needs of certain users: Agriculture requires a very short return visit interval; cartography requires a very small pixel size; land use and geology would be satisfied with moderate resolution and seasonal return times. The aggregate solution of these needs would produce a sensor with extermely high data rates. A sensor concept is proposed which may meet the combined needs without the extreme data rate. Author

N82-28736*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ATTITUDE TRACKER
Frederick C. Billingsley *In its* Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 450-453 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Line array sensors produce data which has no inherent geometrical continuity. Hence, any platform attitude variation will be evidenced as a distortion when the data lines are displayed in the normal Cartesian raster. Ancillary sensing is required to establish the platform attitude to allow geometric rectification. This is normally provided by inertial or star reference attitude sensors. However, in the absence of such sensors or if performance of them is degraded, the required attitude information is lost. A strawman sensor design is proposed which utilizes small image areas on the ground to provide a series of motion vectors with which the platform attitude can be tracked; this allows the distorted image received by the normal image line sensor to be rectified. Author

N82-28737*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Mission Design Section.
A CASE FOR INHERENT GEOMETRIC AND GEODETIC ACCURACY IN REMOTELY SENSED VNIR AND SWIR IMAGING PRODUCTS
Johnie M. Driver *In its* Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 454-468 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Significant aberrations can occur in acquired images which, unless compensated on board the spacecraft, can seriously impair throughput and timeliness for typical Earth observation missions. Conceptual compensations options are advanced to enable acquisition of images with inherent geometric and geodetic accuracy. Research needs are identified which, when implemented, can provide inherently accurate images. Agressive pursuit of these research needs is recommended. A.R.H.

N82-28738*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Scientific Center.

A CONCEPT FOR A FUTURE GROUND CONTROL DATA SET FOR IMAGE CORRECTION
Ralph Bernstein *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 469-474 refs (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

Strips of ground control can be established with current and future satellite sensors. These can provide precise and reliable geometric references for locating and correcting satellite image data and to support temporal image registration. This paper briefly describes the concept and approach for implementing this data base called a Ground Control Strip, and recommends additional work. The advent of new solid state imaging systems, in particular the linear array detectors (pushbroom sensors), make this new concept particularly attractive and practical. Author

N82-28739*# Purdue Univ., Lafayette, Ind. School of Civil Engineering.
CURRENT STATUS OF METRIC REDUCTION OF (PASSIVE) SCANNER DATA
Edward M. Mikhail and J. C. McGlone *In* JPL Proc. of the NASA Workshop on Registration and Rectification 1 Jun. 1982 p 475-486 refs Presented also at the 14th Cong. of the Intern. Soc. for Photogrammetry, Hamburg, 13-25 Jul. 1980 (For primary document see N82-28699 19-43)
Avail: NTIS HC A23/MF A01 CSCL 08B

The extraction of metric information from scanner (particularly multispectral) data is presented. Data from both aircraft and spacecraft; singly scanned areas and areas with multiple coverage; various mathematical models used up to the present time; and published numerical results are considered. Future trends are also discussed. A.R.H.

N82-28740# Army Cold Regions Research and Engineering Lab., Hanover, N. H.
MIZEX. A PROGRAM FOR MESOSCALE AIR-ICE-OCEAN INTERACTION EXPERIMENTS IN ARCTIC MARGINAL ICE ZONES. 1: RESEARCH STRATEGY
Peter Wadhams, ed. (Naval Postgraduage School), Seelye Martin, ed. (Washington Univ.), Ola M. Johannessen, ed. (Bergen Univ.), William D. Hibler, III, ed., and William J. Campbell (U.S. Geological Survey, Tacoma) Jun. 1981 25 p refs
(AD-A107046; CRREL-SR-81-19) Avail: NTIS HC A02/MF A01 CSCL 08/12

Mesoscale studies of Arctic marginal ice zones are described. The processes occurring at the ice margin are studied. These processes are relevant to climate, weather forecasting, petroleum exploration and production, marine transportation, naval operations and commercial fisheries. In addition, the modifications to existing ice ocean atmospheric models needed for better prediction near the ice margin are determined. It is necessary: to study the physical processes affecting interactions between air, ice and sea at the sea-ice margin and to develop methods for their adequate representation in climate models. GRA

N82-28741# Electronics Research Lab., Adelaide (Australia).
LASER HYDROGRAPHY IN AUSTRALIA
M. F. Penny Feb. 1982 39 p refs Presented at the Lasers 81 Intern. Conf. on Lasers and Applications (4th), New Orleans, Dec. 1981
(AD-A113584; ERL-0229-TR; AR-002-821) Avail: NTIS HC A03/MF A01 CSCL 08/10

In response to a Royal Australian Navy requirement, the Electronics Research Laboratory has developed and evaluated an experimental Laser Airborne Depth Sounder. The system provides discrete soundings, in a rectangular pattern extending 270 m across track, with a nominal spacing between soundings of 10 m. This note describes the experimental system, including the position fixing elements, with emphasis on depth sounding performance. Author (GRA)

N82-28742# Environmental Research and Technology, Inc., Lexington, Mass.
MINI RASTER-TO-VECTOR CONVERSION Final Report
Robert K. Crane Sep. 1981 53 p refs
(Contract DAAK70-81-C-0025)
(AD-A113004; ERT-PB002; ETL-0269) Avail: NTIS HC A04/MF A01 CSCL 08/2

A raster-to-vector conversion program was developed for the Defense Mapping Agency (DMA). The program operates on run length coded data from a SCI-TEX scanner. It operates in a 16-bit Digital Equipment Corporation PDP 11/60 minicomputer with limited core storage, less than 64 k-bytes. The program was tested and timed using data supplied by DMA. It vectorized 4879.8 linear inches of contour data in 1.19 hours at 0.005 inch resolution and 1.14 hours at 0.010 inch resolution. The program also developed a number of attributes and contour intersection directories useful for automated editing of the vector data. Author (GRA)

N82-28743# Naval Surface Weapons Center, Dahlgren, Va. Strategic Systems Dept.
AN EXPERIMENTAL COMPUTER ALGORITHM FOR SEAMOUNT MODEL PARAMETER ESTIMATION BASED ON SEASAT-A SATELLITE RADAR ALTIMETRY Final Report
Walter J. Groeger Sep. 1981 58 p refs
(AD-A113169; NSWC/TR-81-200) Avail: NTIS HC A04/MF A01 CSCL 17/9

An experimental computer program for seamount model parameter estimation is formulated. The computer algorithm documented was designed to automatically recognize those characteristic perturbations among satellite radar altimetry data that indicate the presence of seamounts. A digital filter, a roughness detector, a physical model containing the potential theory associated with seamounts and specifying their effect on the sea surface and, finally, the estimator algorithm for the model parameters, in particular peak submergence depth are discussed. An error analysis and computer program checkout data are also included. Author

N82-28744# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY, MITCHELL QUADRANGLE, SOUTH DAKOTA, VOLUME 1 Final Report
Apr. 1981 97 p refs 2 Vol.
(Contract DE-AC13-76GJ-01664)
(DE82-005544; GJBX-385-81-Vol-1) Avail: NTIS HC A05/MF A01

An airborne high sensitivity gamma-ray spectrometer and magnetometer survey was conducted over eleven 20 x 10 quadrangles located in the states of Minnesota and Wisconsin and seven 20 x 10 quadrangles in North and South Dakota. The quadrangles located within the North and South Dakota survey area include Devil's Lake, New Rockford, Jamestown, Aberdeen, Huron, Mitchell, and Sioux Falls. The results obtained over the Mitchell map area are discussed. Geologic and other information with which to assess the magnitude and distribution of uranium resources and to determine areas favorable for the occurrence of uranium in the United States is given. Traverse lines were flown in an east-west direction at a line spacing of six miles. Tie lines were flown north-south approximately twenty-four miles apart. A total of 21,481 line miles of geophysical data were acquired, compiled, and interpreted during the survey, of which 1479 line were miles are in this quadrangle. DOE

N82-28745# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY, MITCHELL QUADRANGLE, SOUTH DAKOTA, VOLUME 2 Final Report
Apr. 1981 124 p refs 2 Vol.
(Contract DE-AC13-76GJ-01664)
(DE82-005572; GJBX-385-81-Vol-2) Avail: NTIS HC A06/MF A01

The results of a high-sensitivity aerial gamma-ray spectrometer survey of the Mitchell Quadrangle, South Dakota are presented. Geologic information to assess the magnitude and distribution of uranium resources and to determine areas favorable for the occurrence of uranium in the US is given in chart form. DOE

N82-28746# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY, NEW ROCKFORD QUADRANGLE, NORTH DAKOTA Final Report

Apr. 1981 98 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-005535; GJBX-387-81-Vol-1) Avail: NTIS HC A05/MF A01

An airborne high sensitivity gamma-ray spectrometer and magnetometer survey was conducted over eleven 20 x 10 quadrangles located in the states of Minnesota and Wisconsin and seven (7) 20 x 10 quadrangles in North and South Dakota. The quadrangles located within the North and South Dakota survey area include Devil's Lake, New Rockford, Jamestown, Aberdeen, Huron, Mitchell, and Sioux Falls. The results obtained over the New Rockford map area are discussed. Traverse lines were flown in an east-west direction at a line spacing of six miles. Tie lines were flown north-south approximately twenty-four miles apart. A total of 21,481 line miles of geophysical data were acquired, compiled, and interpreted during the survey, of which 1397 line miles are in this quadrangle. Geologic and other information with which to assess the magnitude and distribution of uranium resources and to determine areas favorable for the occurrence of uranium in the United States is given. DOE

N82-28747# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY: NEW ROCKFORD QUADRANGLE, NORTH DAKOTA, VOLUME 2 Final Report
Apr. 1981 120 p
(Contract DE-AC13-76GJ-01664)
(DE82-005569; GJBX-387-81-Vol-2) Avail: NTIS HC A06/MF A01

The flight path, radiometric multiparameter staked profiles, magentic and ancillary parameter stacked profiles are presented. Histograms, and anomaly maps for the New Rockford Quadrangle in North Dakota are included. DOE

N82-28748# Oak Ridge Gaseous Diffusion Plant, Tenn. Office of Uranium Resource Evaluation Project.
HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR SHERIDAN QUADRANGLE, WYOMING
31 Aug. 1981 175 p refs
(Contract W-7405-eng-26)
(DE82-002467; GJBX-362-81; K/UR-393) Avail: NTIS HC A08/MF A01

Field and laboratory data are presented for 582 water samples and 526 sediment samples from the Sheridan Quadrangle, Wyoming. The samples were collected and uranium analysis performed. Multielement analysis and data reporting were performed. DOE

N82-28749# High Life Helicopters, Inc., Puyallup, Wash.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY: CRESCENT QUADRANGLE, BURNS QUADRANGLE, CANYON CITY QUADRANGLE, BEND QUADRANGLE, SALEM QUADRANGLE (OREGON) Final Report
1981 84 p Prepared in cooperation with QEB, Inc.
(Contract DE-AC13-79GH-01692)
(DE81-029063; GJBX-240-81-Vol-1) Avail. NTIS HC A05/MF A01

An airborne combining radiometric and magnetic survey was performed over the area covered by the Burns, Crescent, Canyon City, Bend, and Salem, Washington. Data were collected by a helicopter equipped with a gamma-ray spectrometer having a large crystal volume, and a high sensitivity proton precession magnetometer. The radiometric system was calibrated. Data quality was ensured throughout the survey by daily test flights and equipment checks. Radiometric data were corrected for live time, aircraft and equipment background, cosmic background, atmospheric radon, Compton scatter, and altitude dependence. The corrected data were statistically evaluated, plotted, and contoured to produce anomaly maps based on the radiometric response of individual geological units. These maps were interpreted and an anomaly interpretation map produced. DOE

N82-28750# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY COOS BAY, OREGON, VOLUME 1 Final Report
May 1981 133 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-005534; GJBX-408-81-Vol-1) Avail: NTIS HC A07/MF A01

During the months of August, September, and October of 1980 an airborne high sensitivity gamma-ray spectrometer and magnetometer survey over ten (1) areas over northern California and southwestern Oregon was conducted. These include the 20 x 10 NTMS quadrangles of Roseburg, Medford, Weed, Alturas, Redding, Susanville, Ukiah, and Chico along with the 10 x 20 areas of the Coos Bay quandrangle and the Crescent City/Eureka areas combined. The results obtained over the Coos Bay, Oregon, map area are discussed. Line spacing was generally six miles for east-west transverse and eighteen miles for north-south tie lines over the northern one-half of the area. Traverses and tie lines were flown at three miles and twelve miles respectively over the southern one-half of the area. A total of 16,880.5 line miles of geophysical data were acquired, compiled, and interpreted during the survey, of which 863.8 line miles are in this quadrangle. DOE

N82-28751# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
OIL SHAL AND COAL RESEARCH FY 1980 Annual Report, 1980
Mar. 1981 87 p refs
(Contract W-7405-eng-48)
(DE82-002825; LBL-11989) Avail: NTIS HC A05/MF A01

The environmental consequences of shale oil production is discussed. Solid wastes and water and air pollution are discussed. The characterization, transport, fate, and control of organic, organometallic, and inorganic compounds synthesized or released during retorting are discussed. A number of previously unrecognized or little understood environmental concerns were identified, such as in situ leaching, air emission of toxic trace elements, and aqueous effluent disposal. Individual summaries of various research topics are given under the following headings: characterization studies, partitioning studies, retort abandonment, wastewater treatment studies, and coal research (water). Separate abstracts were prepared for 17 of these 18 papers. DOE

N82-28752# Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev. Energy Measurements Group.
AERIAL RADIOLOGICAL AND PHOTOGRAPHIC SURVEY OF ELEVEN ATOLLS AND TWO ISLANDS WITHIN THE NORTHERN MARSHALL ISLANDS. DATES OF SURVEYS, JULY-NOVEMBER 1978
W. J. Tipton and R. A. Meibaum Jun. 1981 425 p refs
(Contract DE-AC08-76NV-01183)
(DE82-005584; EGG-1183-1758) Avail: NTIS HC A02/MF A01

An aerial radiological survey was conducted over eleven atolls and two islands within the northern Marshall Islands. Atolls known to have received direct fallout from the Bravo event were surveyed. These included Bikini, Rongelap, Rongerik, Ailinginae, Bikar, Taka, and Utirik Atolls. In addition, several atolls and islands which might have been at the fringes of the Bravo fallout were also surveyed, including Likiep and Ailuk Atolls, Jemo and Mejit Islands, and Wotho Atoll. Ujelang Atoll, which lies approximately 200 km southwest of Enewetak, was also surveyed. Island-averaged terrestrial exposure rates in the range of 30 to 50 (SIGMA)R/h were observed over parts of Bikini Atoll, including Bikini Island, and over the northern part of Rongelap Atoll. Levels over southern Rongelap and over Rongerik Atoll ranged from 4 to 7 (SIGMA)R/h. Levels were somewhat lower at Ailinginae Atoll (approximately 2 (SIGMA)R/h) and at Utirik Atoll (approximately 0.7 (SIGMA) R/h. DOE

N82-28753# Oak Ridge Gaseous Diffusion Plant, Tenn. Uranium Resource Evaluaton Project.
HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR OPHIR, ALASKA
31 Jul. 1981 110 p refs
(Contract W-7405-eng-81)
(DE82-000851; GJBX-323-81; K/UR-362) Avail: NTIS

HC A06/MF A01

Field and laboratory data are presented for 727 water samples from the Ophir Quadrangle, Alaska. The samples, laboratory analysis, and data reporting are discussed. DOE

N82-28754# Oak Ridge Gaseous Diffusion Plant, Tenn. Uranium Resource Evaluation Project.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR CHEYENNE QUADRANGLE, WYOMING

31 Jul. 1981 169 p refs

(Contract W-7405-eng-26)

(DE82-000786; GJBX-324-81; K/UR-365) Avail: NTIS HC A08/MF A01

Field and laboratory data are presented for 884 water samples and 598 sediment samples from the Cheyenne Quadrangle, Wyoming. Uranium values, laboratory analysis, and data are reported. DOE

N82-28755# Oak Ridge Gaseous Diffusion Plant, Tenn. Uranium Resource Evaluation Project.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR PRESTON QUADRANGLE, WYOMING; IDAHO

30 Jun. 1981 139 p refs

(Contract W-7405-eng-26)

(DE82-000783; GJBX-325-81; K/UR-368) Avail: NTIS HC A07/MF A01

Field and laboratory data are presented for 410 water samples and 702 sediment samples. Uranium values, samples, laboratory analysis, and data reporting are discussed. DOE

N82-28756# Oak Ridge Gaseous Diffusion Plant, Tenn. Uranium Resource Evaluation Project.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR TULAROSA QUADRANGLE, NEW MEXICO

31 Jul. 1981 217 p refs

(Contract W-7405-eng-26)

(DE82-000787; GJBX-326-81; K-UR-370) Avail: NTIS HC A10/MF A01

Field and laboratory data are presented for 284 water samples and 1847 sediment samples from the Tularosa Quadrangle, New Mexico. Laboratory analysis and data reporting were performed. Data is presented in chart form. DOE

N82-28757# Murray-North Partners Ltd., Hamilton (New Zealand).

SMALL HYDRO-ELECTRIC RESOURCE ASSESSMENT: HAURAKI AREA Final Report

Apr. 1981 50 p refs Prepared in cooperation with New Zealand Energy Research and Development Committee, Auckland

(DE82-901428; NZERDC-63) (US Sales Only) HC A04/MF A01; DOE Depository Libraries

Hydrological studies were undertaken to provide data for the evaluation and selection of potential hydroelectric sites in the Hauraki area in New Zealand. This involved determining hydrological statistics for a large number of sites. In only a few instances could the results of a continuous flow gauging record be applied directly to a site. For most sites it was necessary to derive long term mean flow data using the water balance relationship, this was in good agreement with the results of flow gaugings where these were available. Streams draining the porous soils of the Mamaku Plateau to the south were an exception, and reliable flow data in this area can only be obtained from flow gaugings. Flow distribution and flow frequency relationships were estimated on a regional basis. The information derived was sufficient to assist in identifying potential hydroelectric sites meriting further investigation. DOE

N82-28758# Oak Ridge National Lab., Tenn. Computer Sciences Div.

LEAST SQUARES ADJUSTMENT OF LARGE-SCALE GEODETIC NETWORKS BY ORTHOGONAL DECOMPOSITION

J. A. George (Waterloo Univ.), G. H. Golub (Stanford Univ.), M. T. Heath, and R. J. Plemmons (North Carolina State Univ.) Nov. 1981 33 p refs

(Contract W-7405-eng-26)

(DE82-002253; ORNL/CSD-88) Avail: NTIS HC A03/MF A01

Developments in the solution of large sparse least squares problems typical of those arising in geodetic adjustment problems are discussed. The methods are distinguished by their use of orthogonal approach based on the use of the normal equations. The adaptation of these schemes to allow for the use of auxiliary storage and their extension to rank deficient problems are described. T.M.

N82-28759# Pittsburg Energy Technology Center, Pa.

ANALYSIS OF DENSE-PHASE FINE-COAL PNEUMATIC SYSTEMS

S. R. Muley (Pittsburgh Univ.), M. P. Mathur, and G. E. Klinzing (Pittsburgh Univ.) Feb. 1982 24 p refs

(DE82-010243; DOE/PETC/TR-82/6) Avail: NTIS HC A02/MF A01

An analysis of pressure loss data from the 3/8 inch test loop using Montana Rosebud coals of various particle size consists and moisture contents is given. Data from the dense phase flow do not fit the existing theoretical models. A new correlation using multiple regression analysis to fit the entire range of solid loadings was developed. The correlation developed for the solid frictional factor in horizontal flow *(i.e., calculated from total pressure drop minus gas pressure drop) is f/sub s/ = 0.0172 (1-epsilon) (1) 0(5) (V/sub f/ - V/sub s//(INTEGRAL)gD) (+1) (28). When the pressure loss across the pipe was plotted against superficial gas velocity, a minimum in pressure drop occurs, as expected. This minimum in pressure loss demarcates the dense phase region from the dilute phase region. Data indicate that the dilute phase region lies below a loading of 10 pounds of coal per pound of nitrogen, and dense phase emerges above 10 pounds of coal per pound of nitrogen loadings. Particle size effect in the pressure loss data was also observed. As the particle size consist was decreased, the corresponding pressure loss increased. Pressure losses were measured for both horizontal and vertical test sections as well as around a horizontal to vertical bend. The measured pressure losses were compared to existing design correlations for low solid loadings. DOE

N82-28760# Oak Ridge Gaseous Diffusion Plant, Tenn. Uranium Resource Evaluation Project.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR AZTEC QUADRANGLE, NEW MEXICO

31 Jul. 1981 203 p refs

(Contract W-7405-eng-26)

(DE82-000853; GJBX-321-81; K/UR-348) Avail: NTIS HC A10/MF A01

Uranium resources for national energy planning were assessed, and areas favorable for uranium resources were identified. Field and laboratory data are presented for 331 water samples and 1693 sediment samples from the Aztec Quadrangle, New Mexico. Uranium values are reported and samples were collected. DOE

N82-28761# Oak Ridge Gaseous Diffusion Plant, Tenn.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR SILVER CITY QUADRANGLE, NEW MEXICO; ARIZONA

30 Jun. 1981 146 p refs

(Contract W-7405-eng-26)

(DE82-000852; GJBX-320-81; K/UR-345) Avail: NTIS HC A07/MF A01

Field and laboratory data are presented in tables for 405 water samples and 736 sediment samples from the Silver City Quadrangle. DOE

N82-28762# Oak Ridge Gaseous Diffusion Plant, Tenn. Office of Uranium Resource Evaluation Project.

HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR BROWNFIELD QUADRANGLE, NEW MEXICO; TEXAS

30 Jun. 1981 118 p refs

(Contract W-7405-eng-26)

(DE82-000855; GJBX-319-81; K/UR-339) Avail: NTIS HC A06/MF A01

Field and labortory data are presented for 452 water samples and 351 sediment samples. Uranium values, samples, laboratory analysis and data are discussed. DOE

N82-28763# Oak Ridge Gaseous Diffusion Plant, Tenn.
HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA FOR DALLAS NTMS QUADRANGLE, TEXAS
31 Jul. 1981 189 p refs
(Contract W-7405-eng-26)
(DE82-000856; GJBX-318-81; K/UR-157) Avail: NTIS HC A09/MF A01

A reconnaissance geochemical survey of the Dallas Quadrangle, Texas is reported. Field and labortory data are presented for 284 groundwater and 545 stream sediment samples. Statistical and areal distribution plots of uranium and possible uranium related variables are displayed. A generalized geologic map of the survey area is provided. Groundwater produced from the Navarro Group, Neylandville Formation, Marlbrook Marl, and the Glen Rose and Twin Mountains Formations exhibit anomalous uranium (> 9.05 ppB) and specific conductance values. The anomalies represent a southern extension of a similar trend observed in the Sherman Quadrangle, K/UR-110. Stream sediments representing the Eagle Ford Group and Woodbine Formation exhibit the highest concentrations of total and hot acid soluble uranium and thorium of samples collected in the Dallas Quadrangle. The U/TU value indicates that > 80% of this uranium is present in a soluble form. DOE

N82-28764# California Univ., Livermore. Lawrence Livermore Lab.
OIL SHALE PROJECT LARGE RETORT RUN SUMMARY RUN L-3
F. J. Ackerman, W. A. Sandholtz, J. H. Raley, J. F. Carley, L. J. Tripp, A. J. Rothman, and J. H. Campbell 23 Nov. 1981 79 p refs
(Contract W-7405-eng-48)
(DE82-005109; UCID-18595-Rev-1) Avail: NTIS HC A05/MF A01

L-3 was a combustion experiment in the 6.0 Mg retort conducted on May 7-12, 1979. Perhaps the most important conclusion is the high yield (83% of FA) that was achieved using a broad particle size distribution (-30.5 cm, +0.001 cm) with 15 to 20% of the shale larger than 15 cm. The nonuniform flow in the retort was closely predicted by the changing shape of the steam front. Steam front measurements made after the run indicated that the flow distribution through the bed was little affected by the retorting and combustion processes. Therefore, use of the steam front as a diagnostic tool for pre-assessing bed characteristics appears promising. The technique of ignition by hot-gas-preheating worked satisfactorily. No oxygen was observed in the exit gas during the entire retort operation. The temperature of the retort front was controlled by the air flux; no run-away temperatures were encountered when making the step grade change from 18-36 gal/ton. DOE

N82-28765# Western Geophysical Co. of America, Houston, Tex. Aero Service Div.
AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY, ROSEBURG QUADRANGLE, OREGON, VOLUME 1 Final Report
Mar. 1981 121 p refs
(Contract DE-AC13-76GJ-01664)
(DE82-005536; GJBX-388-81-Vol-1) Avail: NTIS HC A06/MF A01

Traverse lines were flown in an east-west direction at a line spacing of six (6) miles. Tie lines were flown north-south approximately eighteen (18) miles apart. A total of 16,880.5 line miles of geophysical data were acquired, compiled, and interpreted during the survey, of which 1596 line miles are in this quadrangle. DOE

N82-28766# Oregon State Univ., Corvallis. School of Oceanography.
ELASTOMECHANICAL METHODS IN THE EXPLORATION OF THE VALLES CALDERA, NEW MEXICO Final Report, 8 Jun. - 8 Oct. 1981
Gunnar Bodvarsson 1981 129 p refs
(Contract W-7405-eng-48)
(DE82-006923; UCRL-15423) Avail: NTIS HC A07/MF A01

The Valles Caldera in the Jemez Mountains of New Mexico is a case of an active caldera that is an object for a comprehensive ground tilt field program to map both elastic and rheic discontinuities. Based on a rather comprehensive theoretical development, estimates of the amplitudes of some of the possible ground tilt signals were obtained. Based on the results, the strongest signals of the order of 100 to 200 nanoradians would appear to result from the purely elastic response of the caldera fill to a barometric forcing. Moreover, assuming a magmatic underplate below the Valles, barometric forcing may lead to a flexure of the upper crust that could generate tilt signals of a similar magnitude. Present data material is insufficient to allow a useful estimate to be made of the possible tilt signals due to the rheic properties of a Valles pluton that may be in the state of partial fusion. DOE

N82-28767# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
FEASIBILITY OF B SPLINE DATA REDUCTION ON REMOTE SENSING DATA
W. C. Huisman and N. J. J. Bunnik 20 Nov. 1980 27 p refs Sponsored by Netherlands Agency for Aerospace Programs (NIVR)
Original contains color illustrations
(NLR-TR-80023-U) Avail: NTIS HC A03/MF A01

Data reduction in the spatial domain of multispectral data, using spline approximation, was investigated for the low frequency components of LANDSAT data, consisting of 240 X 240 pixels. Images of an area featuring high and low frequencies, well defined rectangular landscape features and a good selection of spectral clusters was selected. Four files, each containing pixel data of one band were made. The pixel data were filtered, using spline approximation of order three, and the approximating pixels were calculated by a least squares method. The data were rewritten in FORTRAN, and statistics, isocontours and gray plots were produced. Edge enhancement is recommended. Author (ESA)

N82-28768# Washington State Univ., Pullman. Dept. of Geology.
MANGANESE NODULE RESOURCE DATA, SEA SCOPE EXPEDITION Final Open File Report, 1 Oct. 1979 - 19 Jun. 1981
R. H. Fewkes, W. D. McFarland, and R. K. Sorem 15 Jun. 1981 230 p
(Grant DI-BM-G0-284008)
(PB82-142571; BM-OFR-144-81) Avail: NTIS HC A11/MF A01 CSCL 08I

New information on possible resource value of sea floor manganese nodule deposits in the eastern North Pacific was obtained by a study records and collections of the 1972 Sea Scope Expedition. Nodule abundance (percent of sea floor covered) varies greatly, according to photographs from eight stations and data from other sources. All estimates considered relible are plotted on a map of the region. Similar maps show the average content of Ni, Cu, Mn, and Co at 89 stations from which three or more nodules were analyzed. Variations in nodule metal content at each station are shown graphically in an appendix, where data on nodule sizes are also given. Results of new analyses of 420 nodules from 93 stations for Mn, Fe, Ni, Cu, Co, and Zn are listed in another appendix. Relatively high Ni + Cu content is restricted chiefly to four groups of stations in the equatorial region, where group averages are 1.86, 1.99, 2.47, and 2.55 weight-percent. GRA

N82-28769# Bureau of Mines, Washington, D. C.
ALUMINA AVAILABILITY - DOMESTIC: A MINERAL AVAILABILITY SYSTEM APPRAISAL
Gary R. Peterson, Robert L. Davidoff, Donald I. Bleiwas, and Richard J. Fantel Oct. 1981 30 p refs
(PB82-135468; BM-IC-8861) Avail: NTIS HC A03/MF A01 CSCL 08I

In order to determine the potential availability of alumina to feed U.S. aluminum smelters, the Bureau of Mines evaluated 39 domestic mines and deposits of bauxite, alunite, and high-alumina clays and found that substantial increases in alumina process would be necessary before nonbauxitic deposits could

become competitive with bauxite. A price-tonnage relationship was developed indicating the quantity of alumina that could be produced from known deposits at various alumina prices and at a 15-pct discounted cash flow rate of return on the required capital investment. All capital and operating costs were calculated in August 1980 dollars. GRA

N82-28770# Illinois State Water Survey, Champaign.
SAMPLING FREQUENCY FOR WATER QUALITY MONITORING Final Report
Robert H. Harmeson and Michael J. Barcelona Nov. 1981 95 p refs
(Contract EPA-R-804337)
(PB82-145343; ISWS-81-CON-279) Avail: NTIS HC A05/MF A01 CSCL 08H

The results of a comprehensive study of the effect of sampling frequency on observations of trends in water quality parameters are reported for a 9 station network in Illinois. Based on an acceptable deviation of 10 percent from the annual daily mean values, optimum sampling frequencies were found to vary from monthly to more often than daily. The average percent deviation due to monthly sampling was found to be aceptable for the following water quality parameters: sodium chloride, alkalinity, hardness, and total dissolved for nitrate, ammonium, and dissolved and total phosphorus. The remaining parameters - iron, manganese, copper, zinc, and turbidity - demand more frequent sampling than on a monthly basis to ensure acceptable deviations from long term means. Author

N82-28771# Montana Water Resources Research Center, Bozeman.
SNOW BARRIER POTENTIAL FOR HARVESTING MOISTURE IN TRANSECTS ACROSS CHINOOK AREAS IN MONTANA Final Report
Joseph M. Caprio, Gary K. Grunwald, and Robert D. Snyder Sep. 1981 102 p refs
(Contract DI-14-34-0001-7056)
(PB82-157926; MWRRC-115; W82-02539; OWRT-B-046-MONT(1)) Avail: NTIS HC A06/MF A01 CSCL 08H

The differential effects of snow barriers for trapping moisture in the Chinook region of Montana were evaluated on standing small-grain stubble. During each of three winters treatments at each of 4 to 6 experimental sites on each of two transects included fallow and adjacent stubble areas situated in alternating north-south strips approximately 50 meters wide. Observations at each site included depth and density of snow cover, precipitation, near-surface soil moisture, depth of frozen ground, and moisture collected in mini-lysimeters. Author

N82-28772# Mississippi State Univ., Mississippi State. Dept. of Civil Engineering.
MATHEMATICAL MODELS OF WATER YIELD WITH PARTICULAR REFERENCE TO MISSISSIPPI WATERSHEDS. MATHEMATICAL MODELING OF WATERSHED YIELD Interim Report
Vijay P. Singh Oct. 1981 60 p refs
(Contract DI-14-34-0001-1126)
(PB82-157868; W82-02533; OWRT-A-129-MISS(2); IR-2) Avail: NTIS HC A04/MF A01 CSCL 08H

The objective of this project is to develop procedures for determination of daily, monthly and yearly yields of water for small natural watersheds with particular reference to the State of Mississippi. Currently there exists a multitude of water yields models developed in various parts of the U.S.A. A survey of these models has been made which indicates that one model is not uniformly better than the other. The purpose of the report is to synthesize those components of the model which are particularly suited for this project. Author

N82-28773# Geological Survey, Jackson, Miss. Water Resources Div.
WATER RESOURCES DATA FOR MISSISSIPPI, WATER YEAR 1980 Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Dec. 1981 425 p Sponsored in part by Mississippi Dept. of Natural Resources
(PB82-149006; USGS/WRD/HD-81/091; USGS/WDR/MS-80/1) Avail: NTIS HC A18/MF A01 CSCL 08H

Records of water discharge at 82 gaging stations; stage records for 17 of these gaging stations; stage only at 4 gaging stations; contents for 4 lakes; water quality for 32 gaging stations and 105 wells; and water levels for 360 obsevation wells are presented. Also included are peak-discharge data for 94 crest-stage partial-record stations and water quality data at 19 partial record or miscellaneous sites. Author

N82-28774# Environmental Research and Technology, Inc., Concord, Mass.
COMPARISON OF THEORETICAL AND ACTUAL SATELLITE MICROWAVE BRIGHTNESS TEMPERATURES TO DETERMINE SNOWPACK PROPERTIES Final Report
Hsiao-Hua K. Burke, Clinton J. Bowley, and James C. Barnes Jul. 1981 85 p refs
(Contract NA80SA-C-00763)
(PB82-161118; ERT-A653-F; NOAA-81111604) Avail: NTIS HC A05/MF A01 CSCL 08L

The use of satellite microwave data to determine snowpack properties is investigated. The objectives were to calculate theoretical microwave brightness temperatures using a radiative transfer model, and to compare the computed brightness temperatures with actual satellite microwave measurements. Archived data from the Nimbus-5 and Nimbus-6 Electrically Scanning Microwave Radiometers (ESMR), as well as data from the Nimbus-7 Scanning Multifrequency Microwave Radiometer (SMMR), were analyzed for the primary study area in the north-central United States. Author (GRA)

N82-28775# Christian Michelsens Institutt for Videnskap og Andsfrihet, Bergen (Norway).
NORSEX: TOTAL AND MULTIYEAR ICE CONCENTRATION AT SVALBARD IN SEPTEMBER AND OCTOBER 1979, MAPPED BY SATELLITE MICROWAVE SENSOR AT FREQUENCIES 37 GHz AND 10 GHz
Kjell Kloster May 1981 43 p
(PB82-160029; CMI-781120-6) Avail: NTIS HC A03/MF A01 CSCL 08L

The satellite Nimbus-7 with passive microwave imaging sensor SMMR was used for the production of two-daily maps of total ice and multiyear ice concentration between Sept. 17 and Oct. 27, 1979. The dual-channel algorithm used is based on a simple radiation model. GRA

N82-28776# Bureau of Mines, Washington, D. C.
BUREAU OF MINES RESEARCH 1981: A SUMMARY OF SIGNIFICANT RESULTS IN MINERAL TECHNOLOGY AND ECONOMICS
Jerald R. Pederson, ed. Dec. 1981 157 p refs
(PB82-159971; BM-SP-8-81) Avail: NTIS HC A08/MF A01 CSCL 08I

The Bureau of Mines is responsible for a broad spectrum of programs for meeting the diverse and changing mineral resource needs of the Nation. Bureau program activities are classified into two major functions: (1) Developing new and improved technology that will make the production and processing of minerals more efficient safer and more healthful for mineral workers and the public, and more compatible with a quality environment. (2) Acquiring statistical and economic knowledge related to mineral materials, their availability, production, and use, and performing mineral problem and policy analysis. Significant results in mineral technology and economics, relect the scope of the Bureau's mission, and the success with which that mission is being pursued. GRA

N82-28777# Geological Survey, University, Ala. Water Resources Div.
WATER RESOURCES DATA FOR ALABAMA, WATER YEAR 1980. VOLUME 1: APALACHICOLA CHOCTAWATCHEE, BLACKWATER, ESCAMBIA, PERDIDIO, AND ALABAMA RIVER BASINS Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Sep. 1981 236 p refs
(PB82-164112; USGS-WDR-AL-80-1; USGS/WRD/HD-81/083-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 08H

Water resources data for the 1980 water year for Alabama

consist of records of stage, discharge, and water quality of streams, stage and contents of lakes and reservoirs, and water levels in wells. Discharge records for 49 gaging stations; stage only for 15 gaging stations; stage and contents for 8 lakes and reservoirs; water quality for 34 gaging stations, and water levels for 11 observation wells are provided. Author

N82-28778# Geological Survey, Charleston, W. Va. Water Resources Div.
WATER RESOURCES DATA FOR WEST VIRGINIA, WATER YEAR 1980. APPENDIX: COAL AREAS Water-data Rept. 1 Oct. 1979 - 30 Sep. 1980
Oct. 1981 233 p
(PB82-159674; USGS/WRD/HD-80-003; USGS-WDR-WV-80-A) Avail: NTIS HC A11/MF A01 CSCL 08H

Discharge and water-quality records collected for coal regions of West Virginia during two sampling periods at 369 sites are presented. Also included are sediment data from 26 sites. Data was collected as a part of the statewide Coal Hydrology Project. GRA

N82-28779# Illinois State Water Survey, Champaign.
VERIFICATION OF THE POTENTIAL YIELD AND CHEMICAL QUALITY OF THE ALLOW DOLOMITE AQUIFER IN DUPAGE COUNTY, ILLINOIS
Robert T. Sasman, Richard J. Schicht, James P. Gibb, Michael OHearn, and Curtis R. Benson 1981 50 p refs
(PB82-158361; ISWS/CIR-149/81) Avail: NTIS HC A03/MF A01 CSCL 08H

Groundwater withdrawals from the shallow dolomite aquifer in the west suburban area of the Chicago metropolitan region had a severe impact on water levels and on the long-range capability of wells and well fields to continue to meet demands for increasing volumes of water by municipalities, industries, and individuals. Author

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N82-28780* National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD OF FABRICATING SCHOTTKY BARRIER SOLAR CELL Patent
Richard J. Stirn (JPL, California Inst. of Tech., Pasadena) and Yea-Chuan M. Yeh, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 23 Mar. 1982 11 p Filed 16 Jan. 1981 Supersedes N81-26553 (19 - 17, p 2360)
(NASA-Case-NPO-13689-4; US-Patent-4,321,099; US-Patent-4,278,830; US-Patent-Appl-SN-225501; US-Patent-Appl-SN-93714; US-Patent-Appl-SN-837513; US-Patent-Appl-SN-683073; US-Patent-Appl-SN-597430; US-Patent-Class-148-175; US-Patent-Class-29-572; US-Patent-Class-427-531; US-Patent-Class-427-74) Avail: US Patent and Trademark Office CSCL 10A

On a thin substrate of low cost material with at least the top surface of the substrate being electrically conductive is deposited a thin layer of heavily doped n-type polycrystalline germanium, with crystalline sizes in the submicron range. A passivation layer may be deposited on the substrate to prevent migration of impurities into the polycrystalline germanium. The polycrystalline germanium is recrystallized to increase the crystal sizes in the germanium layer to not less than 5 micros to serve as a base layer on which a thin layer of gallium arsenide is vapor epitaxially grown to a selected thickness. A thermally-grown oxide layer of a thickness of several tens of angstroms is formed on the gallium arsenide layer. A metal layer, of not more about 100 angstroms thick, is deposited on the oxide layer, and a grid electrode is deposited to be in electrical contact with the top surface of the metal layer. An antireflection coating may be deposited on the exposed top surface of the metal layer.
Official Gazette of the U.S. Patent and Trademark Office

N82-28781# General Accounting Office, Washington, D. C.
PROBABLE IMPACTS OF BUDGETS REDUCTIONS ON THE DEVELOPMENT AND USE OF PHOTOVOLTAIC ENERGY SYSTEMS
26 Mar. 1982 19 p refs
(EMD-82-60) Avail: NTIS HC A02/MF A01

The effects of budget reduction on the development of photovoltaic energy systems are considered. N.W.

N82-28782# RAND Corp., Santa Monica, Calif.
PROJECTED ENGINEERING COST ESTIMATES FOR AN OCEAN THERMAL ENERGY CONVERSION (OTEC)
E. C. Gritton, R. W. Hess, and R. Y. Pei Jan. 1982 19 p refs Presented at 8th Ann. Ocean Energy Conf., Washington, D.C., 9 Jun. 1981
(RAND/N-1788-RC) Avail: NTIS HC A02/MF A01

The potential cost reductions that might be achieved if certain engineering, construction and financial improvements were realized in the ocean thermal energy conversion concept were investigated. Six options were analyzed: water-side heat transfer enhancement (for tube-and-shell heat exchangers), plate type heat exchangers, fiberglass reinforced plastic cold water pipes, elmination of the requirement that the transmission cable be buried at ocean depths of less than 300 feet, a shorter construction period, and a reduced fixed charge rate. It was found that the changes having the most effect on capital cost are the two heat exchanger options and the shorter construction period. However, to achieve major reductions in capital cost, say on the order of 30 percent, a combination of one of the heat exchanger options in conjunction with the coldwater pipe, transmission cable and construction period options will be required. R.J.F.

N82-28783*# National Aeronautics and Space Administration, Washington, D. C.
CAPTURING ENERGY FROM THE WIND
James L. Schefter 1982 88 p refs Original contains color illustrations
(NASA-SP-455; NAS 1.21:455; LC-81-600180) Avail: NTIS MF A01; SOD HC $6.00 as 033-000-008-50-3 CSCL 10A

The history of windpower is reviewed. Wind turbine technology is discussed. Examples of small and large turbines are provided. Electric power generation is considered. Numerous illustrations are included. N.W.

N82-28784*# National Aeronautics and Space Administration. Pasadena Office, Calif.
WIND AND SOLAR POWERED TURBINE Patent Application
Ivan D. Wells (JPL), Jin L. Koh (JPL), and Marvin Holmes, inventors (to NASA) (JPL) Filed 19 May 1982 24 p
(Contract NAS7-100)
(NASA-Case-NPO-15496-1; US-Patent-Appl-SN-379602) Avail: NTIS HC A02/MF A01 CSCL 10A

An efficient, cost effective wind and solar driven power generating station is described. It is well adapted for satisfying the electrical power requirements of a relatively small community located in a geographic area having favorable climatic conditions for solar and wind driven power generation. The disc shaped structure is mounted in an elevated position relative to the ground to expose it to the prevailing wind and solar radiation. The structure includes a first plurality of radially extending air passages which direct ambient wind to a radial flow turbine located in an opening in the center of the structure. A solar radiation absorbing surface which has black bodies is disposed over the first plurality of air passages. NASA

N82-28785*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SOLAR CONCENTRATOR PROTECTIVE SYSTEM Patent Application
M. Kudrek Selcuk, inventor (to NASA) (JPL) Filed 25 Jun.

1982 15 p
(Contract NAS7-100)
(NASA-Case-NPO-15662-1; US-Patent-Appl-SN-392103) Avail: NTIS HC A02/MF A01 CSCL 10A

A mechanism that blocks concentrated sunlight from reaching a receiver, in the event of a tracking failure or loss of coolant is described. Sunlight is normally concentrated by a dish reflector onto the opening of a receiver. A faceplate surrounds the opening, and coolant carrying tubes, line the receiver. If the concentrated sunlight wanders so it begins to fall on the faceplate, then the sunlight will melt a portion of a fuse wire and break the wire. Similarly, if there is no coolant in tubes, the wire portion will break. The wire is attached to a flange on a shutter frame, and breaking of the fuse wire allows the frame to fall. Normally, the shutter frame supports shutter elements that are held open by cam followers that bear against cams. NASA

N82-28786*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

ROLLING RESISTANCE OF ELECTRIC VEHICLE TIRES FROM TRACK TESTS

Miles O. Dustin and Ralph J. Slavik Jun. 1982 26 p refs Sponsored in part by NASA
(Contract DE-AI01-77CS-51044)
(NASA-TM-82836; DOE/NASA/51044-24; NAS 1.15:82836) Avail: NTIS HC A03/MF A01 CSCL 13F

Special low-rolling-resistance tires were made for DOE's ETV-1 electric vehicle. Tests were conducted on these tires and on a set of standard commercial automotive tires to determine the rolling resistance as a function of time during both constant-speed tires and SAE J227a driving cycle tests. The tests were conducted on a test track at ambient temperatures that ranged from 15 to 32 C (59 to 89 F) and with tire pressures of 207 to 276 kPa (30 to 40 psi). At a contained-air temperature of 38 C (100 F) and a pressure of 207 kPa (30 psi) the rolling resistances of the electric vehicle tires and the standard commercial tires, respectively, were 0.0102 and 0.0088 kilogram per kilogram of vehicle weight. At a contained-air temperature of 38 C (100 F) and a pressure of 276 kPa (40 psi) the rolling resistances were 0.009 and 0.0074 kilogram per kilogram of vehicle weight, respectively. Author

N82-28787*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

CONVERSION OF HYDROCARBONS FOR FUEL CELL APPLICATIONS. PART 1: AUTOTHERMAL REFORMING OF SULFUR-FREE AND SULFUR-CONTAINING HYDROCARBON LIQUIDS. PART 2: STEAM REFORMING OF n-HEXANE ON PELLET AND MONOLITHIC CATALYST BEDS
Final Report

Maria Flytzani-Stephanopoulos and Gerald E. Voecks Oct. 1981 127 p refs
(Contract DE-AI03-79ET-11326-1)
(NASA-CR-169134; JPL-PUBL-82-37-Pt-1/Pt-2; NAS 1.26:169134; DOE/ET-11326/1-Pt-1/Pt-2) Avail: NTIS HC A07/MF A01 CSCL 10A

The autothermal reforming process for conversion of various hydrocarbons to hydrogen and the use of monolithic catalyst beds in the steam reforming of n-hexane are described. For individual titles, see N82-28788 through N82-28789.

N82-28788*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

AUTOTHERMAL REFORMING OF SULFUR-FREE AND SULFUR-CONTAINING HYDROCARBON LIQUIDS

In its conversion of Hydrocarbons for Fuel Cell Appl. Oct. 1981 p 1-74 (For primary document see N82-28787 19-44)
Avail: NTIS HC A07/MF A01 CSCL 10A

The mechanisms by which various fuel component hydrocarbons related to both heavy petroleum and coal-derived liquids are converted to hydrogen without forming carbon were investigated. Reactive differences between paraffins and aromatics in autothermal reforming (ATR) were shown to be responsible for the observed fuel-specific carbon formation characteristics. The types of carbon formed in the reformer were identified by SEM and XRD analyses of catalyst samples and carbon deposits. From tests with both light and heavy paraffins and aromatics, it is concluded that high boiling point hydrocarbons and polynuclear aromatics enhance the propensity for carbon formation. The effects of propylene addition on the ATR performance of benzene are described. In ATR tests with mixtures of paraffins and aromatics, synergistic effects on conversion characteristics were identified. Indications that the sulfur content of the fuel may be the limiting factor for efficient ATR operation were found. The conversion and degradation effects of the sulfur additive (thiophene) were examined. J.D.

N82-28789*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

STEAM REFORMING OF n-HEXANE ON PELLET AND MONOLITHIC CATALYST BEDS. A COMPARATIVE STUDY ON IMPROVEMENTS DUE TO HEAT TRANSFER

In its Conversion of Hydrocarbons for Fuel Cell Appl. Oct. 1981 p 75-120 refs (For primary document see N82-28787 19-44)
Avail: NTIS HC A07/MF A01 CSCL 10A

Monolithic catalysts with higher available active surface areas and better thermal conductivity than conventional pellets beds, making possible the steam reforming of fuels heavier than naphtha, were examined. Performance comparisons were made between conventional pellet beds and honeycomb monolith catalysts using n-hexane as the fuel. Metal-supported monoliths were examined. These offer higher structural stability and higher thermal conductivity than ceramic supports. Data from two metal monoliths of different nickel catalyst loadings were compared to pellets under the same operating conditions. Improved heat transfer and better conversion efficiencies were obtained with the monolith having higher catalyst loading. Surface-gas interaction was observed throughout the length of the monoliths. J.D.

N82-28790*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

REQUIREMENTS FOR THE CONCEPTUAL DESIGN OF ADVANCED UNDERGROUND COAL EXTRACTION SYSTEMS

Mukund D. Gangal and Milton L. Lavin 15 Dec. 1981 111 p refs Sponsored by NASA
(Contract DE-AI01-76ET-12548)
(NASA-CR-169142; JPL-Publ-81-70; NAS 1.26:169142) Avail: NTIS HC A06/MF A01 CSCL 08I

Conceptual design requirements are presented for underground coal mining systems having substantially improved performance in the areas of production cost and miner safety. Mandatory performance levels are also set for miner health, environmental impact, and coal recovery. In addition to mandatory design goals and constraints, a number of desirable system characteristics are identified which must be assessed in terms of their impact on production cost and their compatibility with other system elements. Although developed for the flat lying, moderately thick seams of Central Appalachia, these requirements are designed to be easily adaptable to other coals. B.W.

N82-28791 Defence Research Information Centre, Orpington (England).

THE APPLICATION OF A BUBBLING MERCURY ELECTRODE TO ANODIC STRIPPING VOLTAMMETRY. DETERMINATION OF ZINC, CADIUM, LEAD AND COPPER IN NATURAL WATER AND INDUSTRIAL WASTE

M. Cospito, P. Zanello, and L. Lucarini Mar. 1982 21 p refs Transl. into ENGLISH from Atti Soc. Tosc. Sci. Nat., Mem., (Italy), v. 80, Series A, 1973 p 266-281
(DRIC-T-6565; BR82846) Copyright. Avail: NTIS HC A02/MF A01

A hanging mercury drop electrode characterized by periodic renewal of the diffusion layer is proposed. A thin covering of mercury is deposited on the tip of a platinum wire sealed in a tube coaxial with an external tube. The wire acts as the cathode in an electrolytic cell, containing a concentrated solution of mercury perchlorate in dilute perchloric acid and using a mercury reservoir as the anode. Before each analysis, four drops of mercury are made to adhere to the wire. Test samples are placed in the cell and oxygen is removed by nitrogen bubbling. A negative voltage 0.25V larger than the stripping peak of the metal to be determined is applied across the electrodes. Concentration is proportional to peak current recorded at the anode. Sensitivity, defined as the amount of current per minute and per mole is ten times lower

than that of other stripping techniques, but polluting ions in water are detected. Author (ESA)

N82-28792# Payne, Inc., Annapolis, Md.
UNDERWATER POWER SOURCE STUDY Final Report
Harold L. Newhouse and Peter R. Payne 1 Nov. 1981 60 p refs
(Contract N62269-81-C-0810; WF11100000)
(AD-A112644; NADC-81157-30) Avail: NTIS HC A04/MF A01 CSCL 10/2

This report is concerned with the development of an ultra low cost underwater propulsion that can horizontally deploy 500 - 1000 feet of sonobuoy cable at depths between 500 and 1000 feet. A trade-off analysis shows that the best system is based on a gas driven water pulsejet (hydropulse) and that the best source of gas is a reaction between Lithium aluminum hydride (LiAlH4) and seawater. The fuel cost for -15 minutes of operation is about $2.00. A design for the pulsejet engine was then prepared (the drawings are in Appendix C) together with reaction rate measuring equipment. This culminates Phase I of the contract. Author (GRA)

N82-28793# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
THERMAL ENERGY STORAGE IN PHASE CHANGE MATERIAL Final Scientific Report, 1 Feb. 1981 - 31 Jan. 1982
P. White and J.-M. Buchlin Mar. 1982 83 p refs
(Grant AF-AFOSR-0119-81; AF Proj. 2301)
(AD-A113355; EOARD-TR-82-8) Avail: NTIS HC A05/MF A01 CSCL 13/1

The present study deals with an experimental investigation of low temperature thermal storage based on macroencapsulation of Phase Change Material (PCM). The storage performance capabilities of capsule bed, tube bank and tubular single-pass heat exchanger are compared. The tests are conducted on the VKI Solar Utility Network (SUN) which is a closed loop facility designed to study air heating systems. An original data acquisition chain based on two conversing microprocessors is developed to carry out mass flow, pressure drop and temperature measurements. The experimental results are interpreted on the basis of comparison with numerical predictions and they allow to draw the following conclusions. Each type of matrix has its own range of operation for practical application but from a heat transfer standpoint, the PCM capsule packing unit is strongly recommended. It is suggested to extend this investigation to the effect of Reynolds number to find optimum range for thermomechanical efficiency. GRA

N82-28794# Altus Corp., San Jose, Calif.
HIGH ENERGY DENSITY BATTERY LITHIUM THIONYL CHLORIDE IMPROVED REVERSE VOLTAGE DESIGN Final Report, Jun. - Dec. 1981
Andrian E. Zolla San Diego, Calif. Naval Ocean Systems Center Dec. 1981 56 p
(Contract N66001-81-C-0310; XF11111801)
(AD-A113498; Rept-0737R-1; NOSC-CR-111) Avail: NTIS HC A04/MF A01 CSCL 10/3

A test program was conducted to demonstrate safety under voltage reversal conditions of the Altus 1400 AH HEDB cell. Eight cells of an improve Anode Grid Design, all cathode (carbon) limited, were forced discharged for 150% of their normal capacity. Minor design variations were tested at 6 amp, 20 C and 12 amp, 0 C with a lithium reference electrode and separate monitoring of current through the internal reverse voltage current shunt feature. There were no ventings and no appreciable increase in cell temperature or internal pressure. Author (GRA)

N82-28795# New Hampshire Univ., Durham.
STUDY OF A WIND ENERGY CONVERSION SYSTEM IN NEW HAMPSHIRE Final Report
John Lockwood, Gordon Kraft, Gerald Pregent, and Larry Smukler Aug. 1981 156 p refs
(Contract N00014-79-C-0725)
(AD-A114418) Avail: NTIS HC A08/MF A01 CSCL 10/2

Concern over conventional energy costs and supplies is currently strong, particularly in New England region where eighty percent of the total energy is oil based; furthermore, forty percent of this region's total energy is OPEC oil. These figures contrast with national averages of forty-seven and thirteen percent, respectively (1). The quest to develop alternative and renewable energy sources indigenous to New England is understandable in light of these figures. The wind is one such source. The study of wind energy can be divided into three basic areas; these are technical, legal-institutional, and financial. The technical area encompasses collection and analysis of wind data, selection and installation of wind turbines and peripheral equipment, and operation and maintenance. The legal-institutional area encompasses the resolution of such issues as land use policies, power contracts, and state and federal regulations. The financial area encompasses the examination of investment opportunities made available by various site-machine combinations and the selling of such opportunities to the investment community.
Author (GRA)

N82-28796# California Univ., Livermore. Lawrence Livermore Lab.
STRATEGIES FOR STEAM HANDLING AND H2S ABATEMENT AT GEOTHERMAL POWER PLANTS IN THE GEYSERS AREA OF NORTHERN CALIFORNIA
W. F. Morris and F. B. Stephens 5 Aug. 1981 66 p refs
(Contract W-7405-eng-48)
(DE82-001144; UCRL-53137) Avail: NTIS HC A04/MF A01

Strict limitations on the emission of H2S from new geothermal power plants in The Geysers area of northern California were imposed by Lake and Northern Sonoma County Air Pollution Control Districts. Lake County, under new source review rules, stipulated that specific technologies should be utilized to limit H2S emissions to 5 lb/h as a condition for determination of compliance. The status of these technologies as well as other ongoing technology development efforts to conserve steam and abate H2S are evaluated. DOE

N82-28797# Franklin Research Center, Philadelphia, Pa.
SURVEY OF COMMERCIAL THERMAL-STORAGE INSTALLATIONS IN THE UNITED STATES AND CANADA
H. G. Lorsch and Michael A. Baker 1981 7 p refs Presented at Ann. Contractors' Rev. Meeting on Thermal and Chem. Storage, Washington, D.C., 14-16 Sep. 1981
(Contract W-7405-eng-26)
(DE82-000131; CONF 810940-14) Avail: NTIS HC A02/MF A01

Nearly 300 thermal energy storage installations in the United States and Canada were identified by a mail and telephone survey. Information was obtained on approximately 220 installations. For 175 installations of hot, cold, and combination hot/cold storage, sufficient quantities of technical information were obtained to warrant inclusion in the report. Water is the most prevalent medium of energy storage. Although almost all respondents indicated satisfaction with the performance of their storage systems, hardly any could provide detailed performance records. Operational and construction cost data were either unobtainable or were not specified sufficiently to be useful. Author

N82-28798# Kirkwood (A. C.) and Associates, Kansas City, Mo.
SURVEY OF DIESEL GENERATION BY SMALL US UTILITIES Final Report
B. J. Kirkwood Nov. 1981 109 p Sponsored by EPRI
(DE82-901291; EPRI-AP-2113) Avail: NTIS HC A06/MF A01

The present and future use of diesel electric power generation is considered. Data and subjective comments provided a perception of both the advantages and the problems associated with these engines and what users see as the needs in future research efforts and equipment application and operation to enhance their use, if indeed such equipment is viable at all. The possibility of developing a data base for this type of generation facility and operation, similar to those existing on other primary generating equipment is considered. A rational potential for continuing this widespread use of generating diesels, if the primary problem of the high relative cost of fuels can be overcome is considered.

N82-28799# Arizona State Univ., Tempe. Coll. of Engineering and Applied Sciences.
NEW LOOK AT LONG-TERM COLLECTOR PERFORMANCE

AND UTILIZABILITY
Donovan L. Evans, Timothy T. Rule, and Byard D. Wood Aug. 1981 58 p refs
(Contract DE-AC03-79CS-30203)
(DE82-005259; ERC-R-81015) Avail: NTIS HC A04/MF A01

A technique to calculate monthly collection efficiency or monthly utilizability for solar thermal flat plate and concentrating generic collectors was developed. The technique is applicable to collectors operating with a fixed fluid inlet temperature. The technique consists of empirically determined performance maps which enable quick evaluations of changes in collector design, geographic location and collector inlet temperature. The collector input variables are those commonly measured in most thermal test procedures; geographic input variables are the mean monthly temperature and K/sub T/. The method gives good results compared to long term hourly simulation. The technique allows determination of operating conditions for collector performance to depend on site-to-site solar radiation/weather variability and uncertainties which can be expected from its use. DOE

N82-28800# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
PRELIMINARY CONCEPTUAL DESIGN FOR GEOTHERMAL SPACE HEATING CONVERSION OF SCHOOL DISTRICT 50 JOINT FACILITIES AT PAGOSA SPRINGS, COLORADO. GTA REPORT NO. 6
I. A. Engen Nov. 1981 30 p refs
(Contract DE-AC07-75ID-01570)
(DE82-005245; EGG-GTH-5599) Avail: NTIS HC A03/MF A01

This feasibility study and preliminary conceptual design effect assesses the conversion of a high schooi and gym, and a middle school building to geothermal space heating is assessed. A preliminary cost benefit assessment made on the basis of estimated costs for conversion, system maintenance, debt service, resource development, electricity to power pumps, and savings from from reduced natural gas consumption concluded that an economic conversion depended on development of an adequate geothermal resource (approximately 1500F, 400 gpm). Material selection assumed that the geothermal water to the main supply system was isolated to minimize effects of corrosion and deposition, and that system compatible components are used for the building modifications. Asbestos cement distribution pipe, a stainless steel heat exchanger, and stainless steel lined valves were recommended for the supply, heat transfer, and disposal mechanisms, respectively. A comparison of the calculated average gas consumption cost, escalated at 10% per year, with conversion project cost, both in 1977 dollars, showed that the project could be amortized over less than 20 years at current interest rates. GRA

N82-28801# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
BIOMASS ENERGY CONVERSION IN HAWAII
Ronald L. Ritschard and Andre Ghirardi Jun. 1981 33 p refs
(Contract W-7405-eng-48)
(DE82-005139; LBL-11902) Avail: NTIS HC A03/MF A01

Materials and processes for producing liquid fuels from biomass are discussed. Direct combustion of biomass is discussed. The use of sugar industry products, tree crops, municipal solid wastes, and other biomass resources is discussed, as well as the environmental impacts of direct combustion systems. DOE

N82-28802# Arizona State Univ., Tempe. Solar Energy Research Lab.
DYNAMIC ANALYSIS AND SIMULATION OF A LARGE SCALE THERMAL SIMULATOR
K. H. Janzen, Barry W. McNeill, and Byard D. Wood Oct. 1981 133 p refs
(Contract DE-AC03-79CS-30203)
(DE82-005588; ERC-R-81027) Avail: NTIS HC A07/MF A01

Computer simulation of a pneumatically controlled, thermal energy simulator system is discussed. Mathematical model of the system was developed. The model was formulated to assist in optimizing the performance of the thermal simulator system and to help in locating areas of improvement, and to provide a tool to assist in designing a thermal simulator system. Modelling goals consisted of formulating: (1) general, component models, (2) an easily modified system model, and (3) an easy to use computer program. The system component models include a pneumatic controller, three way mixing valve and actuator assembly and temperature transmitter, and a steam/water heat exchanger. The thermal simulator was used to experimentally validate the component and system models. System model validation results show that the system model predicts system response adequately. It is shown that the best performance occurred at low gain and high actuator span settings. DOE

N82-28803# Arizona State Univ., Tempe. Solar Energy Research Lab.
DESIGN AND VALIDATION OF A THERMAL SIMULATOR FOR SOLAR SYSTEM PERFORMANCE TESTING
J. F. Kotas, Byard D. Wood, Barry W. McNeill, and Donovan L. Evans Aug. 1981 144 p refs
(Contract DE-AC03-79CS-30203)
(DE82-005589; ERC-R-80031) Avail: NTIS HC A07/MF A01

A liquid thermal simulator which processes heat up to a maximum heat rate of 10.5 kW is discussed. Four in-line water heaters of varying power levels provide energy in discrete steps. Each heater is interfaced by a series of relays to a minicomputer, which also monitors fluid stream temperatures. Time constants and steady state power levels for each heater for six different flowrates were found. Two modes of heating element control were devised. It is shown that dynamic heater control minimized the difference between the desired heat rate and the simulator heat rate much better than the steady state control algorithm. Mathematical models of a flat plate collector and residential cooling load were developed. Simulator thermal output deviated a maximum of 3% from the actual collector output under the identical operating conditions. DOE

N82-28804# California Univ., Livermore. Lawrence Livermore Lab.
ROTARY KILN FOR THE SOLAR DECOMPOSITION OF ZINC SULFATE
Pamela K. Shell, William H. Parrish, Roberto Ruiz, and Oscar H. Krikorian 11 Nov. 1981 31 p refs
(Contract W-7405-eng-48)
(DE82-004323; UCID-19242) Avail: NTIS HC A03/MF A01

A rotating kiln was built for tests coupling the solar central receiver at White Sands, New Mexico with the zinc Sulfate Subcycle as part of a study on the thermochemical production of hydrogen from water. The kiln was specially designed to help overcome some of the problems associated with using solar energy to heat substances with poor absorptivities and will be used to study the advantages of using solar thermal energy to decompose zinc sulfate. DOE

N82-28805# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
THERMAL AND ECONOMIC ANALYSIS OF SOLAR-ASSISTED HEAT PUMPS FOR LOW-TEMPERATURE IPH APPLICATIONS
Sushil K. Chaturvedi and L. M. Murphy Oct. 1981 57 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-006185; SERI/TR-632-880) Avail: NTIS HC A04/MF A01

The potential technical and economic merits of solar assisted heat pump (SAHP) systems (which are high temperature when compared with residential applications) for low-temperature IPH applications are considered. The system looks more promising as the weather becomes more severe, and thus appears to have significant benefit in the less clement industrial areas of the country and in areas where land contraints are a concern. Author

N82-28806# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
SOLAR ENERGY SYSTEM PERFORMANCE EVALUATION: SUMMERWOOD ASSOCIATES, HOUSE G, OLD SAYBROOK, CONNECTICUT, JUNE 1980 - MAY 1981
Michael Raymond 1981 100 p refs
(Contract DE-AC01-79CS-30027)

(DE82-004408; SOLAR/1081-81/14) Avail: NTIS HC A05/MF A01

An active solar energy system designed to supply 62% of the space heating and 100% of the hot water is described. It is equipped with flat plate collectors with pyramidal optics relectors, a 600-gallon concrete storge tank, and an auxiliary system consisting of a dual-source heat pump with electrical resistance heater. The solar fraction of space and water heating was 36%, substantially less than was expected, due to less solar energy being collected than was calculated. The solar savings ratio, conventional fuel savings, system performance factor, and solar system coefficient of performance are also given as well as outdoor temperature, heating degree-days, and daily insolation. The performance of the total system and of the collector, storage, hot water and space heating subsystems is analyzed, and the system operating energy, energy savings, and weather conditions are reported. The system is described and the sensors used are discussed. DOE

N82-28807# Department of Housing and Urban Development, Washington, D. C. Solar Heating and Cooling Demonstration Program.

SOLAR PROJECT DESCRIPTION FOR SADDLE HILL TRUST: LOT 77, SINGLE FAMILY RESIDENCE, MEDWAY, MASSACHUSETTS

David Moore 6 Nov. 1981 45 p Prepared in cooperation with Boeing Company, Seattle

(Contract DE-AB01-76CS-31020)

(DE82-003326; SOLAR/1040-81/50) Avail: NTIS HC A03/MF A01

The system consists of four flat plate air-based collectors with a gross area of 77 square feet, an air-to-water heat exchanger, and a 120-gallon preheat tank for storage. Preheated domestic water is supplied from the preheat tank to a conventional gas-fired 40-gallon domestic hot water tank which supplies the residential hot water demand. The original cost estimate for provisioning and installation of the solar system are given. Four modes of operation are described: collector-to-preheat, preheat-to-domestic hot water, night or cloudy collector condition, and overheat protection. The system performance evaluation instrumentation for the National Solar Data Network is described. T.M.

N82-28808# Automation Industries, Inc., Silver Spring, Md.

NATIONAL SOLAR DATA PROGRAM PERFORMANCE RESULTS, VOLUME 4

1981 45 p refs

(Contract DE-AC01-79CS-30027)

(DE82-002536; SOLAR/0005-81/82) Avail: NTIS HC A03/MF A01

Monitored passive buildings are compared. Performance analysis methodology for passive heating systems in the National Solar Data Network (NSDN) is discussed. Performance of two passive domestic hot water systems is assessed. The NSDN passive program is discussed. Thermal performance of solar systems in the NSDN is assessed. DOE

N82-28809# Sandia Labs., Albuquerque, N. Mex.

INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT, VOLUME 3: MT. LAGUNA RADAR STATION, MT. LAGUNA, CALIFORNIA

Oct. 1981 20 p Prepared in cooperation with Boeing Computer Services Co., Seattle

(Contract DE-AC04-76DP-00789)

(DE82-003006; SAND-81-7090/3) Avail: NTIS HC A02/MF A01

The daily and monthly electric energy production, insolation, and efficiency are given. Energy production is graphed as a function of power level, array field voltage, cell temperature, and hour of the day. The input, output and efficiency of the power conditioner are given. The daily system availability is graphed. Heating and cooling loads, average ambient temperature, and average wind speed are given for the month, and cell temperature, ambient temperature, wind speed and insolation are graphed as a function of the hour of the day. Also the number of occurrences of winds at different azimuth angles is graphed. T.M.

N82-28810# Science Applications, Inc., McLean, Va.

DESIGN HANDBOOK FOR PHOTOVOLTAIC POWER SYSTEMS. VOLUME 1: SIMPLIFIED METHODS FOR UTILITY INTERCONNECTED SYSTEMS

Y. P. Gupta and K. Young Oct. 1981 319 p Prepared for Sandia Labs., Albuquerque, N. Mex.

(Contract DE-AC04-76DP-00789)

(DE82-003108; SAND-80-7147/1) Avail: NTIS HC A14/MF A01

Principles of photovoltaic power system operation and the elements of system design are discussed. Design characteristics and issues (related to site conditions, building architecture, energy use, and economics) which influence PV system design and performance are identified. Economic feasibility and preliminary array sizing for a PV system application are assessed. A system configuration appropriate for the given site, building, and energy application is provided. Standard techniques and concepts of economic evaluation that form the basis for determining cost effective sizes for PV solar arrays are presented. The building energy load data that is required to perform the PV system analyses are characterized. Procedures for estimating residential energy demand are included. The array, estimate performance, and evaluate the economic value of the PV system are sized. Key aspects of system design including module/panel interconnection, array structure, power conditioning, and utility/load interfaces are discussed. DOE

N82-28811# Delaware Univ., Newark. Inst. of Energy Conversion.

Zn3P2 AS AN IMPROVED SEMICONDUCTOR FOR PHOTOVOLTAIC SOLAR CELLS Quarterly Report, 1 Jun. - 31 Aug. 1981

Nov. 1981 37 p refs Sponsored by Midwest Research Inst.

(Contract DE-AC02-77CH-00178)

(DE82-004259; SERI/PR-8062-1-T13; QR-12) Avail: NTIS HC A03/MF A01

Al/Zn3P2 Schottky solar ceils were prepared by depositing a thin film of Al on polycrystalling Zn3P2 wafers by dc sputtering. The samples were heated in air at 1000C for several hours. The change in spectral response of the cells and Auger depth profiles indicate that Al diffuses in Zn3P2. The v/sub oc/ and barrier height in these cells decreased after heating. Attempts were made to find an n-type dopant for Zn3P2. Zn3P2 wafers were annealed in the presence of In, Al, Ca, As and Na, and the conductivity type remained unchanged. The effect of heat treatment on Mg/Zn3P2 cells prepared on thin polycrystalline Zn3P2 films were studied. An n/p junction was formed after heating as evidenced from the change in the cell parameters (V/sub oc/, J0) and the spectral response. The junction depth did not follow the time dependence after prolonged heating. It is suspected that a p( ) layer exists near the back contact due to diffusion of Fe in he Zn3P2 thin film during the film growth. Author

N82-28812# Sandia Labs., Albuquerque, N. Mex. Photovoltaic Concentrator Technology Div.

DESIGN STUDIES FOR CONCENTRATING PHOTOVOLTAIC ARRAYS

Michael W. Edenburn Nov. 1981 29 p refs

(Contract DE-AC04-79DP-00789)

(DE82-005113; SAND-81-0944) Avail: NTIS HC A03/MF A01

Several studies of the past 2 years were compiled. Design areas represented include cell cooling, optical components, and array tracking structures. Many design parameters were optimized to arrive at a minimum cost for energy from an array. T.M.

N82-28813# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ADVANCED SOLAR ENERGY RESEARCH PROGRAM Progress Report, 1 Oct. 1979 - 31 Mar. 1980

Authur J. Nozik, ed. Oct. 1981 87 p refs

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE82-004791; SERI/PR-623-740) Avail: NTIS HC A05/MF A01

Photobiology, photochemical conversion and storage, photoelectrochemistry, and materials research are reported. Three areas of photobiological research under investigation are discussed: in

vitro energy conversion, microbiological hydrogen production, and algal hydrocarbon production. Sensitizers for solar photochemistry, redox catalysis, coupled systems, and inorganic photochemistry are reviewed. Theory and modeling of the energetics of semiconductor/electrolyte junctions and the effects of inversion are reported as well as new semiconductor electrode materials and work on photoelectrodialysis. The mechanisms affecting materials performance in solar energy conversion systems and development of new materials that improve system efficiency, reliability and economics are reported. DOE

N82-28814# Midwest Research Inst., Golden, Colo.
EVALUATION OF THICK-FILE INKS FOR SOLAR CELL GRID METALLIZATION
Steve Hogan and Kay Firor Oct. 1981 58 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-005615; SERI/TR-611-1186) Avail: NTIS HC A04/MF A01

Commercially available thick film conductor links were studied to determine their suitability for use as solar cell front electrical contacts. By varying processing parameters such as firing profile and length of HF etch, it is shown that most of the silver-based inks form good electrical contacts. Regardless of ink composition, adjustment of processing parameters is necessary to optimize the performance of a thick-film solar cell contact. The base metal conductor inks tested are found to be unsuitable for solar cell front metallization. The two major problems encountered were high diffusivities in silicon and high series resistances introduced by the base-metal contacts. T.M.

N82-28815# Mid-American Solar Energy Complex, Minneapolis, Minn.
ECONOMIC ANALYSIS OF SMALL WIND-ENERGY-CONVERSION SYSTEMS FOR TEN MASEC SITES
Sep. 1981 304 p refs
(Contract DE-AC02-79CS-30150)
(DE82-003976; MASEC-R-81-071) Avail: NTIS HC A14/MF A01

The economic feasibility of small wind energy conversion systems (SWECs) was evaluated for ten sites. A computer-based life cycle costing program was utilized in the economic evaluations. The wind energy model (WEM) is an interactive computer tool that may be used to perform ecomomic analyses for many different scenarios. This program deals with information specific to investing in a wind turbine. The WEM uses information on electrical rates, turbine performance, power demand, and wind data to form intermediate quantities which are fed to a life cycle costing program. DOE

N82-28816# Mid-American Solar Energy Complex, Minneapolis, Minn.
ECONOMIC SUMMARY OF WOODY BIOMASS DIRECT COMBUSTION AND GASIFICATION ALTERNATIVES
Aug. 1981 19 p
(Contract DE-AC02-79CS-30150)
(DE82-003140; MASEC-R-81-065; B-101-6) Avail: NTIS HC A02/MF A01

A base case analysis indicates that acceptable rates of return on investment are possible when utilizing wood as a commercial scale boiler fuel. Principal variables include the availability of cost competitive wood fuel over the term of the loan and overall installed cost for the system. In some cases the cost of coal at the point of end use will be comparable with wood. Hardware costs will determine system economics and applicable air quality standards, or lack thereof, will play an important role. The overall economics of using wood for fuel are extremely site specific. The additional 10 percent energy tax credit greatly enhances the economics of a wood fired system, although system economics are very attractive without this tax incentive. Cost of money does not seem to drastically affect overall system economics. DOE

N82-28817# Mid-American Solar Energy Complex, Minneapolis, Minn.
SUMMARY OF THE NORTHSTAR HOME: AN EXTENSION OF THE SOLAR 80 PROGRAM
Sep. 1981 10 p
(Contract DE-AC02-79CS-30150)
(DE82-004688; MASEC-R-81-086; P-101-16) Avail: NTIS HC A02/MF A01

The objective of the Northstar program was to develop and evaluate a detailed design for a low cost house suited for cold climates which would be acceptable to mid-income families and would not need a furnace. The program's four phases are described, including a demonstration design, demonstration construction and monitoring, development of a family of alternative designs, and commercialization. A brief description of the home is included. DOE

N82-28818# Sandia Labs., Albuquerque, N. Mex. Exploratory Batteries Div.
LITHIUM OXIDE IN THE Li(Si)/FeS2 THERMAL BATTERY SYSTEM
Jimmie Q. Searcy, Patricia A. Neiswander, James R. Armijo, and Richard W. Bild Nov. 1981 14 p refs
(Contract DE-AC04-76DP-00789)
(DE82-005114; SAND-81-1705) Avail: NTIS HC A02/MF A01

The performance degradation caused by Li2O and the acceptable level of Li2O that can be used to define required dryness of battery parts and allowable leak rates were determined. Pellets preconditioned with Li2O were used in single cells or in batteries. Their performance was compared with discharges made using pellets with no Li2O added. The actual Li2O present in anode pellets at various stages during fabrication was determined by using 14 MeV neutron activation analysis. Results show that thermal battery production controls should be designed in such a manner that not more than 15 wt.% of the Li(Si) is oxidized at the end of the desired self life. Futhermore, the formation of a Li2O layer equivalent to the oxidation of 6.0 wt.% of the anode on the surface facing the current collector must be prevented. Battery designers must allow for a drop in coulombic efficiency as the Li(Si) reacts, and the effect on performance of Li2O in the separator must be considered. DOE

N82-28819# Sandia Labs., Albuquerque, N. Mex. Thermal/Hydraulic Analysis Div.
DEVELOPMENT OF A RELAP MODEL FOR THE BARSTOW THERMAL-STORAGE SUBSYSTEM
Rupert K. Byers and Lubomyra N. Kmetyk Oct. 1981 63 p
(Contract DE-AC04-76DP-00789)
(DE82-006828; SAND-81-1831) Avail: NTIS HC A04/MF A01

A systems effects plant model was developed to study operational transient response in the Barstow solar-electric pilot power plant, using the nuclear power plant systems program RELAP. A finite-difference, predictor-corrector, numerical technique was included in RELAP to solve for fluid and solid temperature distributions in one-dimensional flow through the dual-media storage tank's packed bed. Nominal flow operating conditions were calculated from zero-power cold- and hot-oil startups for the charging and extraction modes, respectively. T.M.

N82-28820# Sandia Labs., Albuquerque, N. Mex. Enhanced Oil Recovery Div.
ECONOMIC ANALYSIS BASED ON LAND COSTS OF COLLECTOR SPACING IN A COLLECTOR FIELD
David O. Lee Oct. 1981 40 p refs
(Contract DE-AC04-76DP-00789)
(DE82-004519; SAND-81-1165) Avail: NTIS HC A03/MF A01

Three collector fluid outlet average field temperatures were used: 200, 250, and 300 C. Land cost varied from $0.54/sq m to $215.20/sq m. and collector costs from $53.80/sq. m to $322.80/sq. m FOB factory. Costs of fees, controls, foundations, etc, are considered as separate items which are added to the land and collector costs to obtain the total cost of the systems. These studies were normalized to a 5,000,000 Btu/day requirement. Thus, the life-cycle costs of the various configurations are, in essence, the cost of energy. T.M.

N82-28821# Oak Ridge National Lab., Tenn. Engineering Technology Div.
EVALUATION OF NONELECTRICAL ENERGY-TRANSMISSION OPTIONS

T. K. Stovall, S. A. Reed, J. G. Delene, and R. L. Gorton (Kansas State Univ.) Oct. 1981 178 p refs
(Contract W-7405-eng-26)
(DE82-000886; ORNL/TM-7662) Avail: NTIS HC A09/MF A01

The possibility of substituting nonelectrical energy forms (generated at central nuclear plants) for prime fuels (gas and oil) was evaluated. Steam and combustible gases are considered appropriate energy forms for delivery to industrial users. The energy transport mechanisms evaluated include molten salt, hot oil, open and closed loop chemical heat pipes, and hydrogen. Nonnuclear options including medium-Btu gas and hydrogen (both from coal) provide a comparative base for nuclear alternatives. All economic evaluations are presented in constant 1980 dollars for plant startups in the year 1990 and 2000. The delivered-energy cost is provided for each option as a function of delivery distance for a common set of economic ground rules. Environmental, institutional, and other intangible factors are discussed for each energy transport option and for very high temperature reactors. DOE

N82-28822# United Technologies Research Center, East Hartford, Conn.
TECHNICAL AND ECONMIC ASSESSMENT OF FLUIDIZED-BED-AUGMENTED COMPRESSED-AIR ENERGY-STORAGE SYSTEM. VOLUME 1: EXCUTIVE SUMMARY
A. J. Giramonti, R. D. Lessard, D. Merrick (Coal Processing Consultants Ltd.), and M. J. Hobson (Acres American, Inc., Columbia, Md.) Sep. 1981 42 p refs Prepared for Pacific Northwest Lab.
(Contract DE-AC06-176RL-01830)
(DE82-001894; PNL-3686-Vol-1, UTRC-R-80-954490-20) Avail: NTIS HC A03/MF A01

An energy storage system for electric utility peak load applications is a modified gas turbine power system utilizing underground storage of very high pressure air. The compressed air energy storage (CAES) concept involves using off peak electricity generated from indigenous coal or nuclear sources to compress air, storing the air in large underground facilities, and withdrawing the air during peak load periods when it would be heated by combustion and expanded through gas turbines to generate power. The attractiveness of the CAES concept is based upon its potential to supply competitively priced peaking energy, to reduce peak load power plant dependence on petroleum based fuels, and to provide a means for leveling the utility system load demand. Therefore, a technical and economic assessment of coal fired fluidized bed combustor/compressed air energy storage systems was performed and is described. DOE

N82-28823# Acres American, Inc., Columbia, Md.
CONCEPTUAL DESIGN AND ENGINEERING STUDIES OF ADIABATIC COMPRESSED AIR ENERGY STORAGE (CAES) WITH THERMAL ENERGY STORAGE
M. J. Hobson Nov. 1981 216 p refs
(Contract DE-AC06-76RL-01830)
(DE82-005483; PNL-4115) Avail: NTIS HC A10/MF A01

An adiabatic CAES system using water compensated hard rock caverns for compressed air storage was designed. The conceptual plant design features underground containment for thermal energy storage and water compensated hard rock caverns for high pressure air storage. Other design constraints include the selection of turbomachinery designs that require little development and therefore are available for near term plant construction and demonstration. The design is based upon the 231 MW/unit conventional CAES plant design prepared for a site in Maryland. The project, its findings, and the recommendations of the study team are summarized. The development and optimization of the plant heat cycle, and the selection and thermal design of the thermal energy storage system are presented. The selection of turbomachinery and estimated plant performance and operational capability is discussed describes; the control system conept is described, and the conceptual design of the adiabtic CAES plant, the cost estimates and economic evaluation, and an assessment of technical and economic feasibility are also summarized. DOE

N82-28824# Oak Ridge National Lab., Tenn.
FOSSIL ENERGY PROGRAM Quarterly Progress Report, period ending 30 Sep. 1981
L. E. McNeese Dec. 1981 325 p refs
(Contract W-7405-eng-26)
(DE82-005947; ORNL-5833) Avail: NTIS HC A14/MF A01

The progress made during the period from July 1 through September 30 for the Oak Ridge National Laboratory research and development projects in support of the increased utilization of coal and other fossil fuels as sources of clean energy is reported. The following topics are discussed: coal conversion development, chemical research and development, materials technology, fossil energy materials program, liquefaction projects, component development, process analysis, environmental control technology, atmospheric fluidized bed combustion, underground coal gasification, coal preparation and waste utilization. DOE

N82-28825# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ATMOSPHERIC EFFECTS ON SOLAR-CELL CALIBRATION AND EVALUATION
Richard E. Bird and Roland L. Hulstrom Dec. 1981 32 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-007370; SERI/TR-215-1379) Avail: NTIS HC A03/MF A01

Atmospheric effects on cell short currents and calibration numbers for silicon, gallium arsenide and cadmium sulfide cells are illustrated. Radioactive transfer codes are used to illustrate the effects of precipitable water, turbidity, air mass, and global normal irradiance compared with direct normal irradiance on cell performace. Precipitable water is shown to have a relatively large effect on GaAs (5%) as compared to a small effect (2%) on other cells. The quantitative effects of air mass and turbidity are illustrated. It was found that under some atmosphere conditions global calibration methods have a greater dependence on air mass than direct normal calibrations methods. DOE

N82-28826# California Univ., Livermore. Lawrence Livermore Lab.
RAPIDLY-REFUELABLE 167-CM(2) ALUMINUM-AIR POWER CELL
Robert V. Homsy Nov. 1981 44 p refs
(Contract W-7405-eng-48)
(DE82-006251; UCID-19244) Avail: NTIS HC A03/MF A01

The rapidly-refuelable, 167-cm(2) aluminum-air power was tested both as a single cell and as a two cell stack. The electrolyte and is designed for rapid replacement of the anode and easy construction. A maximum power density of 4.2 kW/m(2) was measured. Cathode polarization is negligibly affected by air flow rate and air electrolyte differential pressure across the air cathode. DOE

N82-28827# Century West Engineering Corp., Spokane, Wash.
REGIONAL ASSESSMENT OF AQUIFERS FOR THERMAL ENERGY STORAGE. VOLUME 1: REGIONS 1 THROUGH 6
Jun. 1981 220 p refs 3 Vol.
(Contract DE-AC06-76RL-01830)
(DE82-002507; PNL-3995-Vol-1) Avail: NTIS HC A10/MF A01

The geologic and hydrologic framework, major aquifers, aquifers which are suitable and unsuitable for annual thermal energy storage (ATES) and the ATES potential of the western mountains, alluvial basins, Columbia LAVA plateau, Colorado plateau, high plains, and glaciated central region are discussed. DOE

N82-28828# Century West Engineering Corp., Spokane, Wash.
REGIONAL ASSESSMENT OF AQUIFERS FOR THERMAL-ENERGY STORAGE. VOLUME 2: REGIONS 7 THROUGH 12
Jun. 1981 213 p refs 3 Vol.
(Contract DE-AC06-76RL-01830)
(DE82-002506; PNL-3995-Vol-2) Avail: NTIS HC A10/MF A01

The geologic and hydrologic framework, major aquifers, aquifers which are suitable and unsuitable for annual thermal energy storage (ATES) and the ATES potential of the unglaciated

central region, glaciated Appalachians, unglaciated Appalachians, coastal plain, Hawaii, and Alaska are discussed. DOE

N82-28829# Century West Engineering Corp., Spokane, Wash.
REGIONAL ASSESSMENT OF AQUIFERS FOR THERMAL-ENERGY STORAGE. VOLUME 3: APPENDICES
Jun. 1981 146 p refs 3 Vol.
(Contract DE-AC06-76RL-01830)
(DE82-002505; PNL-3995-Vol-3) Avail: NTIS HC A07/MF A01

The aquifers in the 12 geographic regions of the USA are listed. Each is characterized as containing sands and gravels or limestones or volcanic rock. The hydrologic characteristics of each aquifer are tabulated. DOE

N82-28830# Chicago Univ., Ill.
FUNDAMENTALS AND TECHNIQUES OF NONIMAGING OPTICS FOR SOLAR-ENERGY CONCENTRATION Annual Progress and Status Summary Report
R. Winston and J. J. OGallagher 30 Oct. 1981 17 p refs
(Contract DE-AC02-80ER-10575)
(DE82-004885; DOE/ER-10575/2) Avail: NTIS HC A02/MF A01

The development of the theoretical formulation of nonimaging optical principles and the investigation of practical questions having to do with the implementation of newly developed designs for solar and other applications are discussed. Forms of ideal concentrators known at present as shapes which do not disturb the lines of flow of a vector field defining the so called vector lux J are discussed. A search for a differential equation (other than div J = 0) was unsuccessful in the geometrical optics framework. However, an extension to the physical optics domain based on new theories of radiometry in partially coherent light was initiated and appears more promising. Linear concentrator designs to reduce gap losses for tubular absorbers were analyzed in detail. Fresnel lenses and less conventional diffractive components (i.e. holograms) were studied. A ray trace optimization of two second stage concentrators was carried out. Experimental measurements and ray trace studies of the response of an actual concentrator shape and absorber configuration for a fabricated prototype shows that deviation from ideal behavior can be accurately modeled. DOE

N82-28831# Ball State Univ., Muncie, Ind. Wind Energy Research Team.
DEVELOPMENT OF SLIDE PROGRAM DESCRIBING SITE-SELECTION PROCESS FOR SMALL WIND ENERGY CONVERSION SYSTEMS (SWECS) Semiannual Progress Report
Toru Otawa Dec. 1981 13 p refs
(Contract DE-FG02-81R5-10301)
(DE82-006209; DOE/R5-10301/1) Avail: NTIS HC A02/MF A01

The promotion of better site-selection methods for small wind energy conversion systems (SWECS) is discussed. A slide program is planned which will introduce the general site-selection methods, incorporating the major issues that affect the decision-making process involved in SWECS siting. These major issues are identified as part of the effort to fully examine the state-of-the-art in SWECS siting. DOE

N82-28832# Lincoln Lab., Mass. Inst. of Tech., Lexington.
APPLICATION, SIZING, TESTING AND PERFORMANCE OF THE PHOTOVOLTAIC BATTERY SUBSYSTEM AT NATURAL BRIDGES NATIONAL MONUMENT, UTAH
B. L. Brench Nov. 1981 50 p
(Contract DE-AC02-76ET-20279)
(DE82-007040; DOE/ET-20279/153) Avail: NTIS HC A03/MF A01

During the two years from 24 May 1978 to 7 June 1980, the battery subsystem for the 100-kW peak photovoltaic power system for Natural Bridges National Monument was designed, modified, tested, installed, retested and again modified. The subsystem includes 224 lead-acid (with calcium alloy) cells, hydrogen recombiners, an air-lift pump system and electrolyte level indicators. Problems and solutions related to these subsystem components are discussed. Further details concerning the battery selection, design, tests and performance throughout the battery's life are also included. DOE

N82-28833# Brookhaven National Lab., Upton, N. Y. Technology and Data Div.
PHOTOVOLTAICS AND ELECTRIC UTILITIES
R. Bright, R. Leigh, and T. Sills Dec. 1981 205 p refs Prepared for Sandia Labs., Alburquerque, N. Mex.
(Contract DE-AC04-76DP-00789)
(DE82-006994; SAND-81-7027) Avail: NTIS HC A10/MF A01

The long term value of grid connected, residential photovoltaic (PV) systems is determined. The value of the PV electricity is defined as the full avoided cost in accordance with the Public Utilities Regulatory Policies Act of 1978. The avoided cost is computed using a long range utility planning approach to measure revenue requirement changes in response to the time phased introduction of PV systems into the grid. A case study approach to three utility systems is used. The changing value of PV electricity over a twenty year period from 1985 is presented, and the fuel and capital savings due to FY are analyzed. These values are translated into measures of breakeven capital investment under several options of power interchange and pricing. DOE

N82-28834# Allis-Chalmers Mfg. Co., York, Pa. Hydro Turbine Div.
POWERHOUSE-GATE: CONCEPT DEFINITION STUDY
H. A. Mayo, Jr. 30 Nov. 1981 110 p refs
(Contract DE-FC07-80ID-12200)
(DE82-006226; DOE/ID-12200/T1) Avail: NTIS HC A06/MF A01

The powerhouse-gate concept combines the benefits of standardized hydroelectric generating units and shop fabrication of a structural steel powerhouse which, when in normal operating position, serves as a gate to replace conventional gates and can be raised as a complete assembly above flood levels so that existing structures may be used for the designed spillway purposes. Factors considered include a head range of from 6 to 10 ft; powerhouses including 1, 3, or 4 turbines; structural analysis of the basic powerhouse (3 units) concept without dynamic hydraulic loads; and powerhouse cost and economic evaluation. A computer analysis of the structure with appropriate minor revisions confirmed its structural adequacy and suitability for the application. Estimates of the structure fabrication cost with the addition of standard turbines indicate the potential economic feasibility of the concept. Results to date justify further application studies. DOE

N82-28835# Sandia Labs., Albuquerque, N. Mex.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 4: MT. LAGUNA RADAR STATION, MT. LAGUNA, CALIF.
Dec. 1981 35 p Prepared in cooperation with Boeing Computer Services, Inc., Seattle
(Contract DE-AC04-76DP-00789)
(DE82-007565; SAND-81-7090/4) Avail: NTIS HC A03/MF A01

Performance data are given for a radar station in California for the months of September and October, 1981. Monthly and daily energy production, monthly and daily incident radiation totals, and monthly and daily array field efficiencies are presented. Energy production is graphed as a function of power level, voltage, cell temperature, and hour of the day for each month. Power conditioner input, output, and efficiency are given for each month. The daily availability is graphed for each month. Monthly insolation data, heating and cooling load, ambient temperature average for the month, wind speed and direction data, hourly cell temperaure, ambient temperature, and hourly insolation data are presented. DOE

N82-28836# Sandia Labs., Albuquerque, N. Mex.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 5: NEWMAN POWER STATION SITE, EL PASO, TEX.
Dec. 1981 35 p Prepared in cooperation with Boeing Computer Services, Inc., Seattle

(Contract DE-AC04-76DP-00789)
(DE82-007566; SAND-81-7086/5) Avail: NTIS HC A03/MF A01

Performance data are given for a photovoltaic power supply at a Texas electric utility for the months of September and October 1981. The monthly and daily total electrical energy yield, monthly and daily total solar radiation incident, and the monthly and daily efficiency of the photovoltaic array are given. The energy production is graphed as a function of power level, voltage, cell temperature, and hour of the day. The daily system availability is graphed. The monthly and hourly insolation, monthly and hourly ambient temperature, and monthly and hourly wind speed are given, as are the total monthly heating and cooling loads and wind direction distribution. DOE

N82-28837# Atomic Energy of Canada Ltd., Pinawa (Manitoba). Nuclear Research Establishment.
ENERGY IN CANADA. REVIEW AND PERSPECTIVE
R. S. Dixon Dec. 1980 76 p refs In ENGLISH; FRENCH summary
(DE81-700548; AECL-6807; CA8105398) Avail: NTIS (US Sales Only) HC A05/MF A01; DOE Depository Libraries

Canada's historical energy consumption, its current consumption and its likely requirements by the turn of the century are reviewed. It is estimated that at least 50% more energy will be required in the year 2000 than is consumed now, assuming a minimum 2% growth rate in primary energy consumption. Both nonrenewable and renewable energy resources are examined in the light of these energy requirements and the need to substitute alternative energy sources for conventional oil in various end uses. The comparative risks involved in energy production are also reviewed. Most of the increase in energy consumption and the substitution of oil over the next 20 years is likely to be met by conventional energy sources, since indigenous reserves are extensive and the relevant technologies well established. Coal, nuclear and hydro reserves could cover the increase in energy demand until well into the next century, and natural gas reserves are sufficient to bridge the gap during conversion from oil to other energy sources. Nuclear power using advanced fuel cycles and oil from tar sands offer Canada long term security. DOE

N82-28838# Stuttgart Univ. (West Germany). Inst. fuer Kernenergetik und Energiesysteme.
PRODUCTION OF LIQUID FUELS OUT OF PLANT BIOMASS AND REFUSE: METHODS, COST, POTENTIAL [HERSTELLUNG VON FLUESSIGEN KRAFTSTOFFEN AUS PFLANZLICHEN PRODUKTEN UND MUELL - METHODEN, KOSTEN, POTENTIAL]
Bernd Woick and Rainer Friedrich Sep. 1981 99 p refs In GERMAN; ENGLISH summary
(IKE-K-68; ISBN-0173-6892) Avail: NTIS HC A05/MF A01

Different ways of producing biomass and its conversion into high grade fuel for vehicles are reviewed with particular reference to physical and geographical factors, pertaining in the Federal Republic of Germany (FRG). Even with the potentially small amount of biomass in the FRG, the fueling of diesel engines with rape oil or modified ethanol, which can be obtained from any cellulosic feedstock, seems to pose the fewest difficulties and promises greatest efficiency. However, the amount of fuel produced from biomass can probably only meet a very small percentage of the total amount required. Author (ESA)

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N82-28839*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMPLIFIED FREE-ENERGY CALCULATION FOR ION-INDUCED HETEROMOLECULAR NUCLEATION
Jag J. Singh, Alphonso C. Smith, Lo Y. Chan (Inst. for Atmospheric Optics and Remote Sensing), and Glenn K. Yue (Inst. for Atmospheric Optics and Remote Sensing) Jul. 1982 22 p refs
(NASA-TP-2039; L-15392; NAS 1.60:2039) HC A02/MF A01 CSCL 13B

The Gibbs free energy of formation of ion-induced microclusters in binary vapor mixtures was calculated using a simplified expression based on a modified microscopic surface tension and an empirical electrostatic correction factor. The electrostatic correction factor was obtained by comparing the simplified theory calculations for free energy of selected ion-hydrate formation with the more rigorous molecular-dynamic calculations. Comparison between the cluster spectra predicted by the conventional Thomson theory, a more complex binary nucleation theory, and the present mode indicates that the magnitude of the electrostatic term is critical to the cluster-size spectrum. The present model predicts a broader spectrum, with a larger mean cluster size, than the other models. T.M.

N82-28840# RAND Corp., Santa Monica, Calif.
TECHNICAL OPTIONS FOR REDUCING CHLOROFLUOROCARBON EMISSIONS
W. E. Mooz, S. H. Dole, D. L. Jaquette, W. H. Krase, P. F. Morrison, S. L. Salem, R. G. Salter, and K. A. Wolf Mar. 1982 197 p refs
(Contract EPA-68-01-6231)
(RAND-R-2879-EPA; LC-82-3784; ISBN-0-8330-0395-X) Avail: NTIS HC A09/MF A01

About 100 options in a wide range of product areas that use chlorofluorocarbon (CFC) are examined. There options were ranked by their emissions reducing potential. Most of the technical options accounted for model emissions reductions, were difficult to implement, or were some combination of both. Six major options are listed: mobile air conditioning, solvents, flexible urethane foam slabstock, rigid insulating foam, extended polystyrene sheet and retail fool refrigeration. N.W.

N82-28841# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Biodynamics and Bioengineering Div.
FIELD STUDIES OF THE AIR FORCE PROCEDURES (NOISECHECK) FOR MEASURING COMMUNITY NOISE EXPOSURE FROM AIRCRAFT OPERATIONS Final Report
R. A. Lee Mar. 1982 130 p
(AF Proj. 7231)
(AD-A113672; AFAMRL-TR-82-12) Avail: NTIS HC A07/MF A01 CSCL 20/1

This report describes the results of noise measurements at Laughlin AFB and Homestead AFB to field test the NOISECHECK equipment and procedures developed under contract by Bolt, Beranek and Newman, Inc. and Digital Acoustics Inc. NOISECHECK is the equipment and procedures used by the Air Force to spot check or validate the long term noise exposure predicted by NOISEMAP, the Air Force computer program for predicting community noise exposure from aircraft operations. The total noise exposure level at a specified location has an uncertainty associated with it whether the level is predicted or measured. The purpose of NOISECHECK is to determine the total noise exposure in terms of the Day-Night Level (DNL) metric for a specified ground location from direct measurements. NOISEMAP predicts DNL values for yearly-averaged 'busy days' aircraft operations. Therefore, the direct DNL measurements need to be normalized to this 'busy day' DNL. The NOISECHECK Procedures lead you through these normalizations in a straightforward step-by-step method. The results of the Laughlin and Homestead tests show that, with the proper data collection, the NOISECHECK procedures can validate the long-term noise exposure and explain any differences between the NOISEMAP predicted DNL values and the short term measurement DNL values. Author (GRA)

N82-28842# California Univ., Riverside Statewide Air Pollution Research Center.
ATMOSPHERIC CHEMISTRY OF HYDROCARBON FUELS. VOLUME 2: OUTDOOR CHAMBER DATA TABULATIONS, PART 1 Final Report, Mar. 1980 - Sep. 1981
William P. L. Carter, Paul S. Ripley, Cecil G. Smith, and James N. Pitts, Jr. Tyndall AFB, Fla. AF Engineering and Services Center Nov. 1981 336 p 2 Vol.
(Contract F08635-80-C-0086; AF Proj. 1900)
(AD-A113665; AFESC/ESL-TR-81-53-V-2-P-1) Avail: NTIS HC A15/MF A01 CSCL 04/1

A total of 132 single- and multi-day outdoor environmental chamber experiments were conducted, involving nine different

aviation and automotive fuels. These included the petroleum-derived JP-4 and JP-8 military aviation fuels, their shale-oil derived analogues, unleaded gasoline, diesel No. 2 fuel, and the experimental high-energy cruise-missile fuels JP-10, RJ-4, and RJ-5. The program was conducted to assess the potential of these fuels to adversely affect air quality. Author

N82-28843# California Univ., Riverside. Statewide Air Pollution Research Center.

ATMOSPHERIC CHEMISTRY OF HYDROCARBON FUELS. VOLUME 2: OUTDOOR CHAMBER DATA TABULATIONS, PART 2 Final Report, Mar. 1980 - Sep. 1981

William P. L. Carter, Paul S. Ripley, Cecil G. Smith, and James N. Pitts, Jr. Tyndall AFB, Fla. AF Engineering and Services Center Nov. 1981 316 p 2 Vol.

(Contract F08635-80-C-0086; AF Proj. 1900)

(AD-A113666; AFESC/ESL-TR-81-53-V-2-P-2) Avail: NTIS HC A14/MF A01 CSCL 04/1

The data sheets for the outdoor chamber experiments are provided. Author

N82-28844# Oak Ridge National Lab., Tenn.

ECOLOGICAL IMPLICATIONS OF AIR POLLUTANTS FROM SYNTHETIC-FUELS PROCESSING

D. S. Shriner, S. B. McLaughlin, and G. E. Taylor 1981 10 p refs Presented at 3rd Intern. Conf. on Energy Use Management, West Berlin, West Germany, Oct. 26, 1981

(Contract W-7405-eng-26)

(DE82-002792; CONF-811006-5; Publ-1787) Avail: NTIS HC A02/MF A01

Determination of potential ecological impacts from air pollutants from synfuels facilities involves four major problem areas: effluent characterization; acute and chronic toxicity of effluents; potential for chemical reaction during atmospheric transport and deposition; and biotransformation and accumulation. Compounds of concern, because of our lack of knowledge about their behavior in the environment, include a variety of organics, reduced sulfur and nitrogen compounds, and certain trace metals. Problems related to air pollutants projected to be released from coal conversion facilities are discussed. An overview is presented of potential process operations. Potential pollutant mixtures are discussed, as are the implications of such mixtures for ecological impacts on a regional scale. DOE

N82-28845# Oak Ridge National Lab., Tenn.

POTENTIAL COSTS OF COMPLYING WITH EMISSION REGULATIONS FOR AN INDIRECT COAL-LIQUEFACTION PROCESS

S. P. N. Singh, P. J. Johnson, J. F. Villiers-Fisher, and R. M. Wham 1981 9 p refs Presented at the 2nd World Congress of Chem. Eng., Montreal, 4-9 Oct. 1981

(Contract W-7405-eng-26)

(DE82-001471; CONF-811007-7) Avail: NTIS HC A02/MF A01

Economic assessments were conducted to determine the potential cost of meeting four selected levels of environmental emissions for the Lurgi gasification - ICI methanol synthesis - Mobil MTG indirect coal liquefaction process. Process designs were developed for conceptual plants sited to convert 24,000 tpsd of Wyodak coal into liquids and gaseous products. The results indicate that the stringency of the environmental control levels has a relatively small effect on the ultimate gasoline product price for the environmental constraint levels examined. It would seem to appear that the price likely to be paid to strictly control the release of emissions from coal conversion plants may well be worth the cost of additional deterioration of the environment. T.M.

N82-28846# Tennessee Valley Authority, Muscle Shoals, Ala. Div. of Energy Demonstrations and Technology.

ECONOMICS OF SPRAY-DRYER FGD SYSTEM: THE TWO-STAGE OPEN-LOOP PROCESSES

T. A. Burnett and W. E. OBrien Jun. 1981 139 p refs

(EPRI Proj. 1180-7)

(DE82-900158; EPRI-CS-81-9-LD) Avail: NTIS HC A07/MF A01

Preliminary economics of the two-stage open-loop flue gas desulfurization (FGD) process were determined for both lime and soda ash absorbents. An economic evaluation of a limestone slurry FGD process with an electrostatic precipitator (ESP) for particulate matter removal was included for comparison. The basis was 500-MW power plant burning 3.5% sulfur, 16% ash coal with 90% SO2 removal and 0.1 lb/MBtu particular matter emission. DOE

N82-28847# Coury and Associates, Inc., Lakewood, Colo.

UPSTREAM H2S REMOVAL FROM GEOTHERMAL STEAM Final Report

Nov. 1981 158 p refs Sponsored by Electric Power Research Inst.

(EPRI Proj. 1197-2)

(DE82-901293; EPRI-AP-2100) Avail: NTIS HC A08/MF A01

A heat exchanger process was evaluated as a method for removing hydrogen sulfide (H2S) gas from geothermal steam upstream of a power plant turbine. The process utilizes a heat exchanger to condense geothermal steam so that noncondensable gases (including H2S) can be removed in the form of a concentrated vent stream. Ultimate disposal of the removed H2S gas may then be accomplished by use of other processes such as the commercially available Stretford process. The clean condensate is reevaporated on the other side of the heat exchanger using he heat removed from the condensing geothermal steam. The necessary heat transfer is induced by maintaining a slight pressure difference, and consequently a slight temperature difference, between the two sides of the heat exchanger. Evaluation of this condensing and reboiling process was performed primarily through the testing of a small-scale 14 M(2) (150 ft (2)) vertical tube evaporator heat exchanger. Design and cost estimates for a 2.5 MWe and a 55 MWe unit are presented. DOE

N82-28848# Los Alamos Scientific Lab., N. Mex.

ENVIRONMENTAL AND RADIOLOGICAL SAFETY STUDIES. INTERACTION OF Pu-23802 HEAT SOURCES WITH TERRESTRIAL AND AQUATIC ENVIRONMENTS Quarterly Progress Report, 1 Jul. - 25 Sep. 1981

G. M. Matlack and J. H. Patterson Nov. 1981 6 p

(Contract W-7405-eng-36)

(DE82-004681; LA-9070-PR) Avail: NTIS HC A02/MF A01

Information is sought about radioisotope thermoelectric heat sources to improve their safety. Studies of the effects on the heat sources of terrestrial and aquatic environments and also of the effects of the heat sources on various simulated environments are given. Recent data from environmental chamber and aquatic experiments and the present status of the experiments are discussed. DOE

N82-28849# Idaho National Engineering Lab., Idaho Falls.

ZETA POTENTIAL STUDY OF THE WATER TREATMENT OF GEOTHERMAL BRINES

P. M. Wikoff and D. F. Suciu Nov. 1981 33 p refs

(Contract DE-AC07-76ID-01570)

(DE82-005910; EGG-GTH-5673) Avail: NTIS HC A03/MF A01

Before cooled geothermal fluid is used as a coolant in the operation of a 5MW(e) geothermal pilot power plant, the fluid must be treated to reduce the silica and hardness and to control corrosion. Prior to reinjection, the blowdown is treated to remove the phosphate (one of the corrosion inhibitors added to the system). The zeta potential was studied in order to determine the surface reactions occurring in the flash mixing of the cooled geothermal with magnesium oxide, lime, and polyelectrolyte for silica removal and to determine the optimum polyelectrolyte necessary in the silica reduction system and the reduction of the phosphate in the tower blowdown with ferrous sulfate. A bridging type adsorption occurs in the silica reduction system. The proposed mechanism is described. Between 150 and 250 ppM of magnesium oxide was necessary to achieve this reduction with one ppM of Betz 1125L. Investigation of the phosphate reduction system showed that a cationic polymer was necessary to achieve good flocculation and settling. DOE

N82-28850# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.

ENVIRONMENTAL DATA FOR SITES IN THE NATIONAL

SOLAR DATA NETWORK, OCTOBER 1981
Oct. 1981 113 p refs
(Contract DE-AC01-79CS-30027)
(DE82-002706; SOLAR/0010-81/10) Avail: NTIS HC A06/MF A01

Environmental information collected at the sites of the National Solar Data Network is presented in the form of tables for each solar site. The sites are grouped into 12 zones, each of which consists of several adjacent states. The insolation table presents the total, diffuse, direct, maximum, and extraterrestrial radiation for the solar site. It also shows the ratio of total to extraterrestrial radiation as a percent. The temperature table gives the average, daytime, night-time, maximum and minimum ambient temperature and the inlet-water temperature for the site. All of the passive and some of the active sites are equipped with wind sensors which provide information for two wind tables furnishing wind speed and direction. For some sites, a humidity table provides relative humidity for each day. A technical discussion of the instruments and measurements used to obtain these data tables is included. DOE

N82-28851# California Univ., Livermore. Lawrence Livermore Lab.
ANALYSIS OF THE ATMOSPHERIC AEROSOL SIZE DISTRIBUTION INFORMATION RETRIEVABLE FROM NEAR-LIMB ANGULAR RADIANCE MEASUREMENTS TAKEN ON MAUNA LOA, HAWAII Ph.D. Thesis
K. E. Grant Dec. 1981 160 p refs
(Contract W-7405-eng-48; Grant NOAA-04-78-B01-7)
(DE82-005999; UCRL-53233) Avail: NTIS HC A08/MF A01

Angular radiance measurements of the near limb solar aureole were analyzed for light scattering aerosol particles in the atmospheric column above Mauna Loa, Hawaii. Circumsolar radiance and polarization measurements were collected on Mauna Loa since 1963 for the daily observation of the solar corona. By the use of Mie scattering theory, generalized to treat the sun as a finite diameter light source with limb darkening, a theoretical scattering matrix was calculated for observation angles between 17 ft and 300 ft measured from the center of the solar disk, and aerosol size parameters between 10 and 300. An information content criterion is presented, based on the expected relative norm of the measurement errors and on the eigenvalues of the radiance covariance matrix of the scattering matrix. The observed aureole radiance gradients and two test gradients were inverted to obtain aerosol size distributions using a constrained linear inversion algorithm. DOE

N82-28852# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
IMPREGNATED FILTERS FOR THE DETERMINATION OF FORMALDEHYDE IN INDOOR ENVIRONMENTS M.S. Thesis
Kristin Lynn Geisling Jul. 1981 65 p refs
(Contract W-7405-eng-48)
(DE82-004025; LBL-12927) Avail: NTIS HC A04/MF A01

Techniques for the collection of formaldehyde (HCHO) at ppB-ppM concentrations in air are reported. The HCHO samples are collected on filters impregnated with sodium bisulfite in either an active or passive (diffusional) sampling mode. The HCHO reacts with sodium bisulfite to form a stable addition product. Samples are analyzed by a promulgated analytical method. The average collection efficiency of the filters in the active sampling mode is 101 or 5.6% and concentratios as low as 10 ppB may be detected in an 80-L air sample. The passive monitors collected HCHO linearly over a range of concentrations from 0.05 to 1.0 ppM. In a sampling period of 10 hrs, 10 ppB of HCHO may be detected with the passive sampling device. Test atmospheres of HCHO were generated by decomposing trioxane vapor over an acid catalyst. Observed air concentrations agreed within 3% to those predicted by theory. The generation system was used to produce a range of HCHO concentrations between 0.05 and 2.00 ppM. DOE

N82-28853# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (West Germany). Abt. Experimentelle Atmosphaerenphysik I.
CRITICAL ASSESSMENT OF A SERIES OF LIDAR AEROSOL MEASUREMENT RESULTS
Dieter Paffrath, Ehrenfried Kirchschlager, and Anton Singer Jun. 1981 57 p refs
(DFVLR-FB-82-03) Avail: NTIS HC A04/MF A01; DFVLR, Cologne DM 17.70

Results of simultaneous measurements of atmospheric ruby lidar extinction coefficients, of atmospheric standard visibility, of atmospheric dry aerosol mass concentration and of aerosol size distributions at two sites are assessed. A correlation between extinction coefficient and dry aerosol mass concentration was obtained in the range between 3 and 200 micro g/cum. This is used as a calibration curve, but measurement accuracy is very limited. Relative humidity variations evaluation errors, and aerosol type variations produce deviations from the calibration curve. Regression curves for the two sites vary considerably. Simultaneous measurement of particle content and relative humidity is recommended for pollution monitoring. Author (ESA)

N82-28854# Cornell Univ., Ithaca, N. Y. School of Civil and Environmental Engineering.
INTEGRATION OF PROCESSES FOR WASTEWATER RESIDUALS MANAGEMENT
Richard I. Dick and Yakir Hasit May 1981 184 p refs
(Grant NSF ENV-77-22947)
(PB82-147992; NSF/CEE-81065) Avail: NTIS HC A09/MF A01 CSCL 13B

The manner in which municipal wastewater treatment plant sludge management processes interact with each other and with wastewater treatment processes is examined. The research includes experimental work to develop data on the effect of wastewater and sludge process design and operational procedures on the physical properties of sludges. These observations are incorporated into models of process performance. Costs for energy are extracted from each of the cost models to permit assessment of the implications of energy cost changes on wastewater and sludge management. The economic effects of sludge management are discussed in regard to gravity thickeners, mean cell residence time of the activated sludge process, sedimentation tank size, incineration, ocean disposal, mode of transportation, and electron radiation. Also included are descriptions of process performance models, cost models, and optimal process integration applications. GRA

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation*.

N82-28855 Academy of Sciences (USSR), Moscow. Space Research Inst.
TURBULENT HEATING AND FILAMENT STRUCTURE OF FIELD-ALIGNED CURRENT WITH ANOMAOUS RESISTIVITY
V. A. Liperovsky, S. L. Shalimov, and G. A. Skuridin 1981 14 p refs
(Rept-680) Copyright. Avail: Issuing Activity

Intensive turbulent heating occurs in the electrostatic wave turbulence regions (EWTR) existing in the auroral zone of the magnetosphere in the presence of field aligned currents. However, according to observations, the temperature of the bulk of plasma remains constant. The possible mechanism of heat transfer due to ambipolar anomalous diffusion of the small portion of (hot) ions across the EWTR boundaries is suggested. The model kinetic equation for those ions is obtained and solved. According to estimate, heat transfer is the most sufficient for the transfer thickness of the EWTR just of order of 1 km with a sharp spatial inhomogeneity just of order of thermal ion gyroradius. S.L.

N82-28856 Royal Signals and Radar Establishment, Malvern (England).
AN ATMOSPHERIC REFRACTIVE INDEX FLUCTUATION METER
M. J. Dore and G. J. Anstey Jan. 1982 17 p refs
(RSRE-Memo-3433; BR82844). Copyright. Avail: Issuing Activity

A portable device for measuring the atmospheric refractive index turbulence structure, which can be used by relatively unskilled operators, is presented. It uses pulsed GaAs lamp sources and silicon detectors. Pulses 10 microsec long, repeated every 100 microsec are generated by a timer operating in an astable mode. Amplified pulses drive an LED located at the focal point of a 203 mm focal length, f2 lens. The turbulence signal is extracted by a high pass filter which blocks the dc signal component. The signal is buffered and used as the numerator in an analog divider. Measurement of the refractive index structure constant in the range 10 to the minus 12th to minus 16th powers per 2/3 m can be made, using optical ranges on the order of 50 to 200 m. Author (ESA)

N82-28857 Deutscher Wetterdienst, Offenbach am Main (West Germany).
REPORTS FROM THE GERMAN METEOROLOGICAL SERVICE. NUMBER 156: STATISTICS FOR THE GLOBAL RADIATION AT EIGHT STATIONS OF THE GERMAN METEOROLOGICAL SERVICE [BERICHTE DES DEUTSCHEN WETTERDIENSTES. NR. 156: STATISTIK DER GLOBALSTRAHLUNG AN ACHT STATIONEN DES DEUTSCHEN WETTERDIENSTES]
Fritz Kasten and Hans-Juergen Golchert 1981 218 p refs In GERMAN; ENGLISH summary
(ISSN-0072-4130; ISBN-3-88148-191-5) Avail: NTIS Avail: Issuing Activity

Continuous ten year measurement series of hourly and daily sums of global radiation at eight stations in West Germany were statistically evaluated. Results are presented on tables and diagrams. Besides the mean daily and yearly courses and their deviation, the frequency of given threshold values of global radiation and persistance are shown. Author (ESA)

N82-28858 Deutscher Wetterdienst, Offenbach am Main (West Germany).
SECOND INTERNATIONAL OZONE SONDE INTERCOMPARISON CONFERENCE, 5-20 APRIL 1978
Walter Attmannspacher and Hans Ulrich Duetsch 1981 67 p Conf. held at Hohenpeissenberg, West Germany, 5-20 Apr. 1978
(ISSN-0012-4130; ISBN-3-88148-192-3) Copyright. Avail: Issuing Activity

Data from four different wet chemical ozone sondes, obtained during 23 tandem balloon flights, were compared to obtain a consistent data set for studying anthropogenic influence on ozone in the free atmosphere. Except for the lower troposphere where one sensor reads about 12% higher than the mean of the other and at 15 mbar altitude where another sensor gives 7% lower values than the other the intercomparison does not show any regular height dependent differences in the behavior of the four instruments. There is, however, considerable difference in reliability of the instruments. Author (ESA)

N82-28859# Sonicraft, Inc., Chicago, Ill.
ATMOSPHERIC TRANSMITTANCE/RADIANCE COMPUTER CODE FASCOD2
W. L. Ridgway, R. A. Moose, and A. C. Cogley 16 Oct. 1981 38 p refs
(Contract F19628-79-C-0120; AF Proj. 7670)
(AD-A113825; SCIENTIFIC-2; AFGL-TR-81-0357; SR-2) Avail: NTIS HC A03/MF A01 CSCL 04/1

Modifications to the fast line-by-line atmospheric transmittance and radiance code FASCOD1B are detailed. CO2 far wings are modelled with a new sub-Lorentz lineshape which more properly accounts for foreign gas broadening. A two-parameter exponential-type form factor is developed and used for this purpose. The problem of radiative transfer in the daylight, non-LTE, upper atmosphere is addressed and a model for radiance and transmittance in such a medium is now incorporated in FASCOD2. GRA

N82-28860# Army Communications-Electronics Command, Fort Monmouth, N.J. Communications Systems Center.
TOTAL ELECTRON CONTENT VARIATIONS AT MID-AND HIGH-LATITUDES
H. Soicher and F. J. Gorman Jan. 1982 20 p refs
(AD-A113683; CECOM-82-1) Avail: NTIS HC A02/MF A01 CSCL 04/1

Total electron content (TEC) observations were made at various midlatitude and high latitude stations using beacon satellite emissions from geostationary satellites. The Faraday rotation technique was utilized in making TEC Measurements during the periods near the minimum and maximum of the current solar cycle. Latitudinal, seasonal, and solar-cycle dependence of TEC were observed with seasonal effects being most consistent. Day-to-day variability of TEC, as expressed by the ratio of the monthly standard deviation of TEC to TEC was found to be approx. 25% for the daytime period irrespective of station position, season or solar cycle epoch. Author (GRA)

N82-28861# Naval Postgraduate School, Monterey, Calif.
POWER SPECTRA OF GEOMAGNETIC FLUCTUATIONS BETWEEN 0.02 AND 20 Hz M.S. Thesis
Michael Wayne Beard Dec. 1981 111 p refs
(AD-A113848) Avail: NTIS HC A06/MF A01 CSCL 08/14

Fluctuations of the East-West component of the Earth's geomagnetic field were measured at a remote land site, and the power spectra for the frequency range of .02-20 Hz calculated. The measurements, which covered a 4-month interval consistently show a minimum of activity in the interval 3-7 Hz. At frequencies below the minimum, in the range of .02 - 3 Hz, the typical monotonic decrease in background activity with frequency was observed. At 1 Hz an average power spectral density of .01 n T squared /Hz was observed during the day and .0031 n T squared / Hz at night. In contrast, at frequencies above the minimum, in the range 7-14 Hz, the activity is dominated by the first Schumann resonance. An evaluation of the East-West component spectra and concurrent underwater horizontal component measurements showed a 90% correlation wtih the underwater spectra. The underwater field strengths were normally 3-5 dB less than the strengths measured on land. Splitting of the first Schumann resonance peak into a doublet structure was observed in 10% of the land data. GRA

N82-28862# IRT Corp., San Diego, Calif.
A LITERATURE SURVEY ON INVERSE SCATTERING FOR ELECTRON DENSITY PROFILE DETERMINATION, VOLUME 2 Final Report, 28 Aug. 1980 - 30 Oct. 1981
W. Ross Stone Hanscom AFB, Mass. AFGL 24 Sep. 1981 52 p
(Contract F19628-80-C-0187; AF Proj. 2310)
(AD-A113088; IRT-8205-003-Vol-2; AFGL-TR-81-0282-2) Avail: NTIS HC A04/MF A01 CSCL 04/1

An extensive literature survey on the field of inverse scattering as it applies to determining the spatial distribution of electron density in the ionosphere is presented. The references are primarily from the period 1970-1981. Abstracts are included. Author (GRA)

N82-28863# Defense Mapping Agency, Washington, D.C.
INERTIAL SURVEYING TECHNOLOGY Final Report
Armando Mancini 14 Nov. 1981 18 p refs
(AD-A107379) Avail: NTIS HC A02/MF A01 CSCL 08/5

Inertial Surveying is the process of ascertaining position and gravity field parameters from measured accelerations. Typically, the observer traverses the survey course in a vehicle such as a van or helicopter and operates instrumentation which records the vehicle's acceleration history as the survey proceeds. The instrumentation, similar to that used for inertial navigation, consists of very accurate and precise accelerometers, gyros, data recording equipment, a computer, and support electronics. The gyros provide a precise reference frame for the acceleration measurements. The computer integrates the acceleration measurements into velocity and position data to provide a real-time display during the traverse and stores information for later post-survey processing (smoothing). The general theory, operations, system description and results will be presented. Author (GRA)

N82-28864# Naval Research Lab., Washington, D. C. Plasma Physics Div.
THE ELECTRON AVALANCHE IONIZATION OF AIR AND A SIMPLE AIR CHEMISTRY MODEL Interim Report
A. W. Ali 15 Apr. 1982 29 p refs
(ARPA Order 3718)

(AD-A113501; NRL-MR-4794) Avail: NTIS HC A03/MF A01 CSCL 20/9

The ionization frequency in air as a function of E/P and the electron temperature are presented over a wide range of E/P (50-1000). From these a correspondence relation between T sub e and E/P is derived. A simple chemistry model is given for the description of the avalanche ionization for an electric discharge ionization in air. Author (GRA)

N82-28865# Rice Univ., Houston, Tex.
MODELING OF HIGH-LATITUDE CURRENTS IN A SUBSTORM
J. L. Karty, C.-K. Chen, R. A. Wolf, M. Harel, and R. W. Spiro 11 Dec. 1981 33 p refs
(Contract F19628-80-C-0009; AF Proj. 2311)
(AD-A114311; SR-1; AFGL-TR-81-0363) Avail: NTIS HC A03/MF A01 CSCL 04/1

A quantitative model is developed to compute currents and electric fields in the area covered by the poleward set of field aligned currents. The high latitude band carries most of the westward electrojet and lies just poleward of the region treated in computer simulation (which covers the inner magnetosphere and corresponding ionosphere). The high-latitude current model supplements the inner magnetosphere simulations to make them nearly global. It is assumed that Birkeland current and aurorally enhanced conductivity are uniformly distributed across the band. The time dependent conductivity model is based on electron fluxes and mean energies measured from the S3-2 satellite. Ionospheric electric fields and currents are calculated; ionospheric neutral winds are neglected. It is found that Joule heating of the upper atmosphere, as inferred from calculation of currents and electric fields in the high latitude region are about 2 x 10 to the 11th power watts during the substorm period. E.A.K.

N82-28866# Boston Univ., Mass. Dept. of Astronomy.
AIRGLOW IMAGING STUDIES OF NATURAL AND ARTIFICIALLY INDUCED IONOSPHERIC DISTURBANCES Final Scientific Report, 1 Oct. 1979 - 30 Sep. 1981
Michael Mendillo, Jeffrey Baumgardner, and Harlan Spence Hanscom AFB, Mass. AFGL Feb. 1982 96 p refs
(Contract F19628-77-C-0270; AF Proj. 4643)
(AD-A114369; ACBU-SER-III-16; AFGL-TR-82-0075) Avail: NTIS HC A05/MF A01 CSCL 04/1

A low light level, image intensified airglow monitoring system has been developed for ground-based studies of 6300A airglow characteristics of equatorial plasma depletions and rocket exhaust induced ionospheric holes. The system was designed for narrow band interference filters (6 A FWHP) with interchangeable all-sky (180 deg) and narrow field (60 deg) lenses; it records images photographically using a standard 35mm camera. In addition to the morphology features capable of being extracted directly from airglow photographs, the field test data were used to investigate various image processing techniques that could yield quantitative, photometric characteristics for the effects recorded. The two week equatorial campaign resulted in sufficient data to study airglow depletion occurrence rates, spatial extents, alignments, drift speeds, depths and edge effects. The rocket hole data provided estimates of high altitude diffusion rates and in-situ values for photochemical reaction rates related to natural and perturbation processes. GRA

N82-28867# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
AURORAL PARTICLE DISTRIBUTION FUNCTIONS AND THEIR RELATIONSHIPS TO INVERTED Vs AND AURORAL ARCS
J. F. Fennell, D. J. Gorney, and P. F. Mizera 12 Apr. 1982 34 p refs
(Contract F04701-81-C-0082)
(AD-A114365; TR-0082(2940-05)-6; SD-TR-82-23) Avail: NTIS HC A03/MF A01 CSCL 04/1

Utilizing data from three satellites the document presents the relationship between the particle energy and angular distributions, the resulting auroral forms, and spatial features such as the inverted V and electrostatic structures. The occurrence of field-aligned electrons over a wide range of energies near and at the edges of inverted V structures in the low altitude local evening auroral region is an outstanding feature in the data. The DMSP pictures often show a brightening of the auroral form in coincidence with similar intense electron precipitation at the edges of inverted V structures. Preliminary examination of the S3-3 data has produced only a few such events with a tendency for them to occur at lower altitudes. As a separate topic, a detailed description of a high altitude inverted V structure is presented using S3-3 data. The region contained strong perpendicular electric field structures embedded therein. The potential drop in the region peaks near 16 kV with 10-12 kV below and 4-6 kV above 8000 km. The modification of the electron distributions due to strong electric field structures is analyzed. The signature of the acceleration in the electrons is consistent with an acceleration region that starts 2000-4000 km above the satellite altitude of 8000 km and extends well below the satellite. Author (GRA)

N82-28868# Beers (Roland F.), Inc., Alexandria, Va.
ELECTRON BEAM TRANSPORT IN THE IONOSPHERE: ENERGY DEPOSITION AND OPTICAL EMISSIONS BASED UPON THE COMBINED EFFECTS OF PLASMA TURBULENCE AND PARTICLE-PARTICLE INTERACTIONS Final Report, Jan. - Dec. 1981
D. J. Strickland, D. L. Lin, V. W. Pine, and M. J. Schmidt Feb. 1982 71 p refs
(Contract F19628-81-C-0048; AF Proj. 7601)
(AD-A114376; AFGL-TR-82-0083) Avail: NTIS HC A04/MF A01 CSCL 20/8

The problem of electron beam propagation in the E-region is examined. A model is developed to describe that part of beam spreading due to plasma turbulence. The basis of the model is that the given turbulence can cause a series of effective displacements delta r(GC) of the beam electron guiding centers through a corresponding series of briefly experienced perpendicular components of the turbulent electric field. Weak turbulence theory is considered and applied to cases of warm and cold beams. A Monte Carlo code has been developed to follow the spreading of the beam electron guiding centers where delta r(GC) is given altitude dependence. An analytic expression is used when delta r(GC) is constant with altitude. The turbulence model is used to examine beam spreading as observed by Davis, et al., (1971) and Hallinan, et al., (1978). We can generally account for the observed amount of spreading by adding in the contribution due to particle-particle interactions. Optical properties associated with beam energy deposition are also modeled. Most features in the UV and visible portion of the optical spectrum are considered along with their emission efficiencies. GRA

N82-28869# Geological Survey, Reston, Va.
INTERPRETATION OF TIME-DOMAIN ELECTROMAGNETIC SOUNDINGS IN THE CALICO HILLS AREA, NEVADA TEST SITE, NYE COUNTY, NEVADA
J. Kauahikaua 1981 35 p refs
(Contract DE-AI08-78ET-44802)
(DE82-004260; USGS-OFR-81-988) Avail: NTIS HC A03/MF A01

A controlled source, time domain electromagnetic (TDEM) sounding survey was conducted in the Calico Hills area of the Nevada Test Site (NTS). The geoelectric structure was determined as an aid in the evaluation of the site for possible future storage of spent nuclear fuel or high level nuclear waste. The data were initially interpreted with a simple scheme that produces an apparent resistivity versus depth curve from the vertical magnetic field data. These curves are qualitatively interpreted much like standard Schlumberger resistivity sounding curves. Final interpretation made use of a layered earth Marquardt inversion computer program. The results combined with those from a set of Schlumberger soundings in the area show that there is a moderately resistive basement at a depth no greater than 800 meters. The basement resistivity is greater than 100 ohm meters. DOE

N82-28870# Sandia Labs., Albuquerque, N. Mex.
GAS-DRIVEN FRACTURE PROPAGATION
R. H. Nilson Oct. 1981 45 p refs
(Contract DE-AC04-76DP-00789)
(DE82-003079; SAND-79-2379) Avail: NTIS HC A03/MF A01

A one dimensional gas flow drives a wedge shaped fracture

into a linearly elastic, impermeable half space which is in uniform compression at infinity. Under a constant driving pressure, p0, the fracture/flow system accelerates through a sequence of three self similar asymptotic regimes (laminar, turbulent, inviscid) in which the fracture grows like an elementary function of time (exponential, near unity power, and linear; respectively). In each regime, the transport equations are reducible under a separation of variables transformation. The integro differential equations which describe the viscous flows are solved by iterative shooting methods using expansion techniques to accommodate a zero pressure singularity at the leading edge of the flow. These numerical results are complemented by an asymptotic analysis for large pressure ratio which exploits the disparity between the fracture length and penetration length of the flow. DOE

N82-28871# California Univ., Livermore. Lawrence Livermore Lab.

COMPUTER MODELS TO SUPPORT INVESTIGATIONS OF SURFACE SUBSIDENCE AND ASSOCIATED GROUND MOTION INDUCED BY UNDERGROUND COAL GASIFICATION

B. C. Trent (Science Applications, Inc.) and R. T. Langland Aug. 1981 39 p refs

(Contract W-7405-eng-48)

(DE82-004936; UCRL-53029) Avail: NTIS HC A03/MF A01

Surface subsidence induced by underground coal gasification at Hoe Creek, Wyoming, and Centralia, Washington were compared. Calculations with the STEALTH explicit finite difference code match equivalent, implicit finite element method solutions for the removal of underground material. Effects of removing roof material, varying elastic constants, investigating thermal shrinkage, and burning multiple coal seams are studied. A coupled, finite difference continuum rigid block caving code is used to model underground opening behavior. The two methods, numerical and empirical, are most effective when used together. DOE

N82-28872# Institut fuer Angewandte Geodaesie, Frankfurt am Main (West Germany).

ON ASTRO-GRAVIMETRIC CALCULATION OF THE QUASIGEOIDS FOR THE FEDERAL REPUBLIC OF GERMANY [EINE ASTRO-GRAVIMETRISCHE BERECHNUNG DES QUASIGEOIDS FUER DIE BUNDESREPUBLIK DEUTSCHLAND]

Dieter Lelgemann, Dieter Ehlert, and Hermann Hauck 1981 68 p refs In GERMAN; ENGLISH summary

(Ser-A-92; Mitt-160; ISSN-0071-9196) Avail: NTIS HC A04/MF A01

Characteristics, computation formulas, data and results of a combined astro-gravimetric determination of the quasigeoid are described. The result of a least squares adjustment are 786 coefficients of a series of analytic Kernel functions, which approximate the quasigeoid in the area of the Federal Republic of Germany. The coefficients are stored in the data statement of a FORTRAN subroutine GEOID. A call of the subroutine with the geodetic latitude and longitude of a point P, as input parameter yields the quasigeoid undulation as well as the deflections of the vertical at this point P as output.

Author (ESA)

N82-28873# Danish Space Research Inst., Lyngby.

OCCURRENCES OF THE POLAR SLANT E CONDITION (SEC) AT NARSSARSSUAQ, GODHAVN, THULE, DENMARK FOR 1980

I. S. Primdahl 1982 48 p refs

Avail: NTIS HC A03/MF A01

Tables of SEC taken from ionograms are presented. Monthly data sheets of quarter or half hourly SEC occurrences are given.

Author (ESA)

N82-28874# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Analysis and Prediction Div.

ONE-AND TWO DIMENSIONAL PHOTOCHEMICAL MODELING OF THE CHEMICAL INTERACTIONS IN THE MIDDLE ATMOSPHERE (0-120 km) Ph.D. Thesis - California Univ.

Susan Solomon 1981 282 p refs

(Grant NSF ATM-77-23747)

(PB82-156613; NCAR/CT-62) Avail: NTIS HC A13/MF A01 CSCL 04A

Photochemical modeling studies on the middle atmosphere are described, with particular emphasis on the photochemistry of the nitrogen oxides, their production in the lower thermosphere, and possible transport to the stratosphere. A one-dimensional photochemical model which treated the troposphere and stratosphere was extended to include the mesosphere and lower thermosphere. This model was used to study the ion and neutral chemistry of charged particle precipitation events. The production of NO and OH by such events and their effects on atmospheric ozone in the stratosphere and mesosphere are described. A two dimensional model was also extended to treat the lower thermosphere and mesosphere, as well as the stratosphere and troposphere. Author

N82-28875# National Geodetic Survey, Rockville, Md.

PRECISE DETERMINATION OF THE DISTURBING POTENTIAL USING ALTERNATIVE BOUNDARY VALUES

Erwin Groten Aug. 1981 78 p refs

(PB82-150392; NOAA-TR-NOS-90; NGS-20; NOAA-81102104) Avail: NTIS HC A05/MF A01 CSCL 08E

Advanced gravimetric techniques can be applied for the precise determination of geodetic parameters. Data from the Global Positioning System (GPS) and from GRAVSAT type satellites lend themselves to combinations and comparisons with terrestrial data. Such comparisons are of special interest for well known systematic distortions in terrestrial data. In addition, new types of data lead to new types of boundary value problems and imply fundamental changes in geodetic concepts. Author

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N82-28876 Deutscher Wetterdienst, Offenbach am Main (West Germany).

REPORTS FROM THE GERMAN METEOROLOGICAL SERVICE. NUMBER 158: CONTRIBUTION TO PHENOLOGY OF EUROPE 4 LONG TERM PHENOLOGICAL OBSERVATION SERIES FOR WESTERN, CENTRAL, AND EASTERN EUROPE [BERICHTE DES DEUTSCHEN WETTERDIENSTES. NR 158: BEITRAEGE ZUR PHAENOLOGIE EUROPAS 4 LANGE PHAENOLOGISCHE BEOBACHTUNGSREIHEN IN WEST-, MITTEL- UND OSTEUROPA]

Fritz Schnelle 1981 36 p refs In GERMAN; ENGLISH summary

(ISSN-0072-4130; ISBN-3-88148-193-1) Avail: Issuing Activity

Several long-term series of plant and vegetation observations from western, central, and eastern Europe were analyzed. Computations of means of 30 years show larger variation in the mean dates for the beginning of the different phenological phases which vary considerably from place to place during the vegetation period. It is suggested that these variations in time of the mean phenological beginning of the phase indicate seasonal and regional trends in climate. Author (ESA)

N82-28877 Deutscher Wetterdienst, Hohenpeissenberg (West Germany).

SPECIAL OBSERVATIONS BY THE HOHENPEISSENBURG METEOROLOGICAL OBSERVATORY. NO. 44: RESULTS OF AEROLOGICAL AND SURFACE OZONE MEASUREMENTS DURING THE FIRST SEMESTER OF 1981 [SONDERBEOBACHTUNGEN DES METEOROLOGISCHEN OBSERVATORIUMS HOHENPEISSENBERG. NR 44: ERGEBNISSE DER AEROLOGISCHEN UND BODENNAHEN OZONMESSUNGEN IM 1. HALBJAHR 1981]

1981 200 p Partly in GERMAN and ENGLISH

(ISSN-0581-1287) Avail: Issuing Activity

Tabular and graphical ozonometry results are presented. Surface ozone measurement data cover day of measurement, daily mean of ozone near the ground (nbar), daily maximum of ozone near the ground (nbar), hour of maximum (GMT), duration of extreme values in excess of 100 nbar in tens of minutes,

daily minimum (nbar), and monthly mean (without extreme values). Total ozone measurement data, determined by Dobson-spectrophotometer, comprise day of measurement, time of observation, type of measurement (direct Sun of blue zenith), number of measurements for daily mean, and total ozone amount for AD and C wavelengths (daily mean values). The wavelengths are: (A) 305.5 nm, 325.4 nm; (C) 311.45 nm, 332.4 nm; and (D) 317.6 nm, 339.8 nm. Author (ESA)

N82-28878# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
TROPICAL CYCLONE MOTION: ENVIRONMENTAL INTERACTION PLUS A BETA EFFECT
Greg J. Holland [1982] 51 p refs Sponsored by Navy
(ISSN-0067-0340; Atmospheric-Science-Paper-348) Avail: NTIS HC A04/MF A01

The dynamics of tropical cyclone motion are investigated by solving the vergent barotropic vorticity equation on a beta plane. Two methods of solution are presented: a direct analytic solution for a constant basic current, and a simple numerical solution for a more general condition. These solutions indicate that cyclone motion can be accurately prescribed by a nonlinear combination of two processes: (1) an interaction between the cyclone and its basic current (the well known steering concept), and (2) an interaction with the Earth's vorticity field which causes a westward deviation from the pure steering flow. The nonlinear manner in which these two processes combine together with the effect of asymmetries in the steering current raise some interesting questions on the way in which cyclones of different characteristics interact with their environment, and has implications for tropical cyclone forecasting and the manner in which forecasting techniques are derived. Author

N82-28879*# Nova Univ., Fort Lauderdale, Fla. Satellite Surface Stress Working Group.
SCIENTIFIC OPPORTUNITIES USING SATELLITE WIND STRESS MEASUREMENTS OVER THE OCEAN
Jun. 1982 166 p refs
(Contract NAS5-26714)
(NASA-CR-169100; NAS 1.26:169100) Avail: NTIS HC A08/MF A01 CSCL 04B

The ability to determine the vector wind field at the sea surface was assessed. The vector stress or wind field from space is used for the study of upper ocean circulation. The required measurement is the vector horizontal tangential stress, which is the lower boundary condition for the atmosphere and the upper boundary condition for any wind driven wave or ocean current model. Since limited direct observations of vector stress were obtained over the ocean, the wind speed and direction were estimated at 19.5 m. S.L.

N82-28880*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
USER'S GUIDE FOR THE TOTAL-OZONE MAPPING SPECTROMETER (TOMS) INSTRUMENT FIRST YEAR OZONE T DATA SET
A. J. Fleig, K. F. Klenk (Systems and Applied Sciences Corp., Bladensburg, Md.), P. K. Bhartia (Systems and Applied Sciences Corp., Bladensburg, Md.), and D. Gordon (Systems and Applied Sciences Corp., Bladensburg, Md.) Jun. 1982 50 p refs
(NASA-RP-1096; NAS 1.61:1096) Avail: NTIS HC A03/MF A01 CSCL 04B

The TOMS experiment and algorithms are described. Detailed information on the data available on computer tape is provided. Author

N82-28881*# Tennessee Univ. Space Inst., Tullahoma.
ANALYSIS OF VIBRATION INDUCED ERROR IN TURBULENCE VELOCITY MEASUREMENTS FROM AN AIRCRAFT WING TIP BOOM Final Report
Safwan H. Akkari and Walter Frost Washington NASA Jun. 1982 77 p refs
(Contract NAS8-34627)
(NASA-CR-3571; NAS 1.26:3571) Avail: NTIS HC A05/MF A01 CSCL 04B

The effect of rolling motion of a wing on the magnitude of error induced due to the wing vibration when measuring atmospheric turbulence with a wind probe mounted on the wing tip was investigated. The wing considered had characteristics similar to that of a B-57 Cambera aircraft, and Von Karman's cross spectrum function was used to estimate the cross-correlation of atmospheric turbulence. Although the error calculated was found to be less than that calculated when only elastic bendings and vertical motions of the wing are considered, it is still relatively large in the frequency's range close to the natural frequencies of the wing. Therefore, it is concluded that accelerometers mounted on the wing tip are needed to correct for this error, or the atmospheric velocity data must be appropriately filtered. Author

N82-28882# Weather Wing (1st), Hickam AFB, Hawaii.
TERMINAL FORECAST REFERENCE NOTEBOOK, OSAN AB, KOREA
30 Jun. 1981 112 p
(AD-A107433; AD-E850103; REPT-1WW/TFRN/81/001) Avail: NTIS HC A06/MF A01 CSCL 04/2

This publication provides weather forecasting guidelines for Osan AB, Korea. The types of information contained within these guidelines is location, topography, local effects customer requirements, and support provided, synoptic climatology, forecast studies, climatological data, synoptic case studies, and TAF work and preparation sheets. GRA

N82-28883# Weather Wing (1st), Hickam AFB, Hawaii.
TERMINAL FORECAST REFERENCE NOTEBOOK, CAMP CASEY, KOREA
1 Aug. 1981 44 p
(AD-A107432; AD-E850104; REPT-1WW/TFRN/81/002) Avail: NTIS HC A03/MF A01 CSCL 04/2

This publication provides weather forecasting guidelines for Camp Casey, Camp Stanley, and Camp Stanton. All of which are located in the Republic of Korea. The types of guidelines contained in this study are: location, topography, local effects, weather impact on supported units, synoptic climatology, and terminal forecast work and preparation sheets. Also included are AWS Climatic Briefs for each station. GRA

N82-28884# Weather Wing (5th), Langley AFB, Va.
TERMINAL FORECAST REFERENCE NOTEBOOK, FRESNO AIR TERMINAL, CALIFORNIA
20 Apr. 1981 79 p
(AD-A107434; AD-E850101; REPT-5WW/TFRN-81/004) Avail: NTIS HC A05/MF A01 CSCL 04/2

This terminal forecast reference notebook is for Fresno Air Terminal, California. It describes the following topics concerning forecasting weather at Fresno: location, topography, and local effects; impact of weather on supported units; synoptic climatology; climatic aids; operationally significant forecast problems; approved forecast studies; rules-of-thumb; and special synoptic studies and references. GRA

N82-28885# Materials Research Labs., Ascot Vale (Australia).
PERCENTAGE FREQUENCY DISTRIBUTIONS OF TEMPERATURE AND HUMIDITY FOR AUSTRALIA (1963-77)
J. A. McRae Nov. 1981 209 p refs
(AD-A113664; MRL-R-835; AR-002-741) Avail: NTIS HC A10/MF A01

The frequency distributions of ambient temperature and humidity listed in this report were prepared in the course of a study on the factors in Australian climatic environment that are of interest to the Defense Forces. A number of more limited frequency distributions of temperature and humidity have been published (1,2,3) but no comprehensive set of frequency distributions is available. The tables have proved to be of value in a number of contexts both within and without the Department of Defence. They are published to make the information contained in them more widely available. Author (GRA)

N82-28886# Photometrics, Inc., Woburn, Mass.
IDENTIFICATION OF REQUIREMENTS FOR ATMOSPHERIC DATA Final Report, 1 Feb. 1978 - 31 Jul. 1981
Christian A. Trowbridge and Irving L. Kofsky Hanscom AFB, Mass. AFGL 31 Jul. 1981 21 p refs
(Contract F19628-79-C-0073; AF Proj. 6781)
(AD-A113640; PHM-08-81; AFGL-TR-82-0015) Avail: NTIS HC A02/MF A01 CSCL 04/2

A computerized method of vector triangulation for determination of horizontal wind profiles and shear in the stratosphere is described. Positions in photographic images of sunlight-scattering smoke trails released from rockets are automatically recorded by a digital video densitometer operating in an on-axis mode, from which three-dimensional positions are obtained. Requirements for accuracy of location and 3-axis orientation of the triangulation cameras, needed to provide 10 meter altitude accuracy, are outlined. A logic design for a new generation hardware system is presented. Author (GRA)

N82-28887# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). RANDOLPH AFB, SAN ANTONIO, TEXAS. PARTS A-F Final Report
8 Feb. 1982 467 p
(AD-A113704; AD-E850152; USAFETAC/DS-82/012) Avail: NTIS HC A20/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Keesler AFB, Biloxi, Mississippi. It contains the following parts: (A) Weather Conditions: Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form in most cases in percentage frequency of occurance or cumulative percentage frequency of occuring tables. GRA

N82-28888# Control Data Corp., Monterey, Calif.
TIME SCALES OF SYSTEMATIC ERRORS IN A NUMERICAL WEATHER FORECAST Final Report
Patrick A. Harr Monterey, Calif. Naval Environmental Prediction Research Facility Jan. 1982 59 p ref
(Contract N00228-80-C-QE83; W0513CC00)
(AD-A113374; NEPRF-CR-82-03) Avail: NTIS HC A04/MF A01 CSCL 04/2

Statistical methods are implemented to determine a minimum data period needed to constitute a time scale, within which numerical forecasts errors are truly systematic and not smoothed fields of rapidly varying random errors for a synoptic scale event. Long term or model climatological error patterns of a specific event are compared with randomly determined shorter term error patterns through statistical tests and measures to provide results which indicate a minimum case number needed to sufficiently smooth out unwanted random errors. Author

N82-28889# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). TAEGU AB, KOREA. PARTS A, C-F Final Report
7 Oct. 1981 415 p
(AD-A113228; AD-E850142; USAFETAC/DS-81/100; USAFETAC/DS-81/095) Avail: NTIS HC A18/MF A01 CSCL 04/2

This report is a five-part statistical summary of surface weather observations for Taegu AB, Korea. It contains the following parts: (A)Weather Conditions; Atmospheric phenomena; (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28890# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). LAJES AB, AZORES. PARTS A-F Final Report
25 Nov. 1981 422 p Supersedes USAFETAC/DS-81/006 (AD-A113227; AD-E850143; USAFETAC/DS-81/103; USAFETAC/DS-81/006) Avail: NTIS HC A18/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Lajes AB, Azores. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28891# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). FORBES FLD, KANSAS. PARTS A-F Final Report
23 Dec. 1981 489 p
(AD-A113226; AD-E850140; USAFETAC/DS-82/008) Avail: NTIS HC A21/F A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Forbes Field, Kansas. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28892# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). THULE AB, GREENLAND. PARTS A-F Final Report
18 Dec. 1981 484 p
(AD-A113225; AD-E850141; USAFETAC/DS-82/007) Avail: NTIS HC A21/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Thule AB, Greenland. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28893# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). BURLINGTON IAP, VERMONT. PARTS A-F Final Report
23 Dec. 1981 487 p
(AD-A113224; AD-E850139; USAFETAC/DS-82/006) Avail: NTIS HC A21/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather

observations for Burlington IAP, Vermont. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28894# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). ATLANTIC CITY, NEW JERSEY. PARTS A-F Final Report
23 Nov. 1981 473 p
(AD-A113180; AD-E850134; USAFETAC/DS-81/102; USAFETAC/DS-81/002) Avail: NTIS HC A20/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Atlantic City NAFEC Pomona Apt, New Jersey. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. Period of Record from Hourly OBS: June 1973 - May 1981 Period of Record from Daily OBS: February 1945 - March 1946, June 1946 - May 1981. GRA

N82-28895# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). KANSAS CITY IAP, MISSOURI. PARTS A-F Final Report
9 Dec. 1981 482 p
(AD-A113179; AD-E850135; USAFETAC/DS-82/003) Avail: NTIS HC A21/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Kansas City IAP, Missouri. It contains the following parts: (A)Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28896# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). BANGOR INTERNATIONAL/DOW AFB, MAINE. PARTS A-F Final Report
6 Nov. 1981 479 p
(AD-A113178; AD-E850131; USAFETAC/DS-81/105) Avail: NTIS HC A21/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Bangor International, Dow AFB, Maine. It contains the following parts: (A)Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28897# Air Force Environmental Technical Applications Center, Scott AFB Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). SCOTT AFB, BELLEVILLE, ILLINOIS. PARTS A-F Final Report
12 Aug. 1981 478 p Supersedes USAFETAC/DS-81/049 (AD-A113177; AD-E850132; USAFETAC/DS-81/081; USAFETAC/DS-81/049) Avail: NTIS HC A21/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Scott AFB, Belleville, Illinois. Period of record from hourly observations: March 1971 - February 1981. Period of record from daily observations: January 1938 - December 1938, March 1939 - February 1981. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28898# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). AMARILLO MAP, TEXAS. PARTS A-F Final Report
2 Dec. 1981 495 p
(AD-A113176; AD-E850144; USAFETAC/DS-81/10) Avail: NTIS HC A21/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Amarillo MAP, Texas. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. Period of record from Hourly OBS: June 1973 - May 1981. Period of record from Daily OBS: July 1946 - May 1981. GRA

N82-28899# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). EDMONTON IAP, ALBERTA, CANADA. PARTS A-F Final Report
30 Dec. 1981 454 p
(AD-A113175; AD-E850145; USAFETAC/DS-82/005) Avail: NTIS HC A02/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Edmonton IAP, Alberta, Canada. It contains the following parts: (A) Weather Conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and

extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28900# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). NELLIS AFB, LAS VEGAS, NEVADA. PARTS A-F Final Report
29 Oct. 1981 518 p
(AD-A113154; AD-E850133; USAFETAC/DS-81/104) Avail: NTIS HC A22/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Nellis AFB, Las Vegas, Nevada. It contains the following parts: (1) Weather Conditions; Atmospheric Phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (3) Surface winds; (4) Ceiling versus Visibility; Sky Cover; (5) Psychrometric Summaries (daily maximum and minimum temperatures, pschrometric summary of wet-bulb temperature depression versus dry bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperatures and relative humidity); and (6) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28901# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). MCCONNELL AFB, WICHITA, KANSAS. PARTS A-F Final Report
14 Dec. 1981 486 p
(AD-A113155; AD-E850136) Avail: NTIS HC A21/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for McConnell AFB, Kansas. It contains the following parts; (1) Weather Conditions; Atmospheric Phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (3) Surface winds; (4) Ceiling versus Visibility; sky cover; (5) Psychrometric Summaries (daily maximum and minimum temperatures, psychrometric summary of wet bulb temperature depression versus dry bulb temperature, means and standard deviations of dry bulb, wet bulb and dew point temperatures and relative and humidity); and (6) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N82-28902# Air Weather Service, Scott AFB, Ill. Aerospace Services Directorate.
CLIMATOLOGY TABLES FOR 7 CORPS FORWARD AREAS Final Report
Jan. 1982 119 p
(AD-A113034; AD-E850148; AWS/TN-82/001) Avail: NTIS HC A06/MF A01 CSCL 04/2

Publication provides climatology of significant weather conditions that can be expected to impact on tactical operations in VII Corps Forward Areas. GRA

N82-28903# Air Weather Service, Scott AFB, Ill. Aerospace Services Dirctorate.
EAST COAST FOG: A CASE STUDY Final Report, 27 - 29 Dec. 1980
Thomas C. Wann Nov. 1981 18 p
(AD-A113110; AD-E850150; AWS/TN-81/003) Avail: NTIS HC A02/MF A01 CSCL 04/2

This case study covers a 48-hour period, 27-29 December 1980, East Coast fog situation. An abnormal cold air mass over the eastern seaboard was confronted with a warm, moist onshore flow. The brisk onshore flow as a result of a strong pressure gradient which developed between an intensifying high and deepening low. The study emphasizes the need for a local analysis program which will detect onshore flow and possible extensive fog formation. GRA

N82-28904# Systems and Applied Sciences Corp., Riverdale, Md.
ESTIMATING THE TOPS, BASES, AND AMOUNT OF CLOUDINESS FROM IN SITU SAMPLING Final Report, 1 Nov. 1980 - 17 Nov. 1981
C. N. Touart, Ralph Shapiro, Peter J. Mansfield, and Randy Schechter Hanscom AFB, Mass. AFGL 17 Nov. 1981 75 p refs
(Contract F19628-81-C-0017; AF Proj. 2688)
(AD-A113107; AFGL-TR-81-0351) Avail: NTIS HC A04/MF A01 CSCL 04/2

How accurately can the bases, tops, and amounts of the cloud layers over a tactical target area be determined from measurements made with an airborne sensor capable only of detecting cloud presence in situ? Various sampling patterns are evaluated in terms of accuracy of cloud inferrence as well as cost in fuel and time. Surprisingly, it is found that the best strategy is to sample the volume in alternate ascents and descents in tight spirals, thereby producing a regular pattern of widely separated point measurements in each horizontal plane over the target area. The inherent redundancy of closely spaced samples of cloudiness results in a wastage of fuel in horizontal flight that more than compensates for the higher rate of fuel consumed in multiple ascents. Author (GRA)

N82-28905# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
FREQUENCY RESPONSE MEASUREMENTS ON LYMAN-ALPHA HUMIDIOMETERS
J. T. Priestley and W. D. Cartwright Feb. 1982 16 p refs
(Grant ARO-55-81)
(AD-A113240; NOAA-TM-ERL-WPL-92; ARO-18029.1-GS) Avail: NTIS HC A02/MF A01 CSCL 04/2

The primary instrument used for measuring high-frequency humidity fluctuations is the Lyman-alpha humidiometer; yet, there is virtually no published data on its frequency response. Attempting to fill this void, both amplitude and phase measurements were made on several such instruments. These measurements showed frequency responses (amplitude 3 dB down) ranging from approximately 160 to 800 Hz. Measurements of a specially modified unit showed no fundamental frequency limitation up to at least 10 kHz. Author (GRA)

N82-28906# Aeronautical Research Labs., Melbourne (Australia).
A DESIGN STUDY FOR A METEOROLOGICAL INSTRUMENTATION SYSTEM FOR AN OMEGA TOWER
A. K. Patterson Jul. 1981 37 p
(AD-A112868; ARL/Struc-TM-332) Avail: NTIS HC A03/MF A01 CSCL 04/2

A design proposal for a meteorological instrumentation system for the OMEGA tower in South-East Victoria is described. The system includes sensors on booms at five tower levels, and additional sensors at the ten meter level and at ground level, transmitting data by radio link to a computer based data logger located in the Omega buildings. Emphasis has been placed on flexibility, ease of adaptation to different experiments, ease of use, reliability, and serviceability. Author (GRA)

N82-28907# Rochester Univ., N. Y. Div. of Biostatistics.
MODELING TEMPERATURE DATA: AN ILLUSTRATION OF THE USE OF BIPLOTS AND BIMODELS IN NONLINEAR MODELING Ph.D. Thesis
Michael C. Tsianco and K. Ruben Gabriel Sep. 1981 72 p
(Contract N00014-80-C-0387; ONR Proj. 042-442)
(AD-A114169; TR-81/15) Avail: NTIS HC A04/MF A01 CSCL 04/2

The paper describes a strategy for exploration and modeling of multivariate data. The data illustrated are temperatures at 50 North, Central and South American stations; the techniques rely

heavily on lower rank approximation, biplot and binomial display, least squares fitting, and examination of residuals. The biplot/bimodel display is shown to reveal the relation of temperatures to various geographical features, (No new meteorological findings are claimed--the example is used mainly to illustrate the technique.) More strikingly, the bimodel shows an elliptical configuration of the markers for the different months. The paper shows how this ellipse implies a harmonic model for the temperatures themselves. This model makes good physical sense and its parameters are readily understood in meteorological terms. Some summary comments are made about the usefulness of biplots and bimodels for diagnosing models that may fit the data. Author (GRA)

N82-28908# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

LOCAL AND REGIONAL WINDS: THEIR NAMES AND ATTRIBUTES

Danuta Martyn 30 Mar. 1982 173 p refs Transl. into ENGLISH of Pr. i Studia Instytutu Geograficznego Universytetu Warszawskiego (Poland), v. 22, no. 9, 1977 102 p
(AD-A114224; FTD-ID(RS)T-1721-81) Avail: NTIS HC A08/MF A01 CSCL 04/2

The terminology for dealing with local and regional winds as well as atmospheric circulation in general is given. Variants for terms are given. R.J.F.

N82-28909# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

STORM WARNINGS ON LAKE BALATON

G. Gotz 6 Apr. 1982 193 p refs Transl. into ENGLISH from Veroffeentichugen der Ungarischen Zentralanstalt fuer Meteorol. Sturmwarnung am Balatonsee (Budapest), v. 30, 1966 p 6-154
(AD-A114322; FTD-ID(RS)T-1722-81) Avail: NTIS HC A09/MF A01 CSCL 04/2

An independent storm warning service within the Hungarian Weather Service, which operates in the summer months in an observatory was created in order to warn bathers and boaters on the lake of impending dangerous winds. The procedures and prediction methods developed are discussed in the interest of developing and improving the activity of the storm warning service. GRA

N82-28910# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

BULLETIN OF HYDROLOGICAL AND METEOROLOGICAL SERVICE, SELECTED ARTICLES

Kristina Lechowicz-Kwiecien 2 Apr. 1982 86 p refs Transl. into ENGLISH from Wiad. Sluzby Hydrol. i Meteorol. (Poland), v. 6, no. 4, 1958 p 149-201
(AD-A114382; FTD-ID(RS)T-1669-81) Avail: NTIS HC A05/MF A01 CSCL 04/2

The characteristics of the meteorological elements: temperature, wind, pressure, air, precipitation, humidity, cloud cover, and storms are presented. The material is constituted from meteorological observations at stations in Hel, Calupy, Gdynia, Rozewie, and Karwia. The main special feature of this region is the great variability in each of the elements cited here, both from day to day as well as from year to year. The longest season of the year is the transitional period between the short summer and the winter, that is, the periods of before spring, the spring itself, the autumn, and before winter. The summer is relatively cold, and the winter is primarily mild. The early autumn is the nicest season of the year, but towards the end of autumn, a cycle of strong storms begins which lasts up until spring. GRA

N82-28911# Naval Postgraduate School, Monterey, Calif.

STATISTICAL POST-PROCESSING OF THE NAVY NESTED TROPICAL CYCLONE MODEL AND THE OPERATIONAL TROPICAL CYCLONE MODEL Final Report, Oct. 1980 - Sep. 1981

James E. Peak and Russell L. Elsberry Sep. 1981 55 p refs
(AD-A114150; NPS63-81-003) Avail: NTIS HC A04/MF A01 CSCL 04/2

A statistical technique for adjusting dynamical tropical cyclone motion forecasts is extended to the Two-Way Interactive Nested Tropical Cyclone Model (NTCM) and the operational One-Way Interactive Tropical Cyclone Model (TCMO). The technique utilizes linear regression equations to reduce systemic errors. Backward extrapolation positions are presented as a less expensive, but inferior, alternative to the backward integration positions required by the original technique. A scheme is developed for applying the technique in storm motion coordinates as well as zonal meridional coordinates. Tests with 186 NTCM cases indicate moderate improvement in forecast errors by the zonal meridional regression technique, and slight improvement by the storm coordinate scheme. In TCMO tests with 212 cases, the zonal meridional regression equations reduced the forecast errors, but the storm coordinate equations did not. Author

N82-28912# New Zealand Energy Research and Development Committee, Auckland.

STANDARD WEATHER DATA FOR NEW ZEALAND Final Report

F. N. Blackwell May 1981 25 p
(DE82-901427; NZERDC-62) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

To accurately predict the performance of air conditioning and other equipment a system was developed to give some indication of hourly weather conditions during a design day. Such a system allows comparison between differing air conditioning systems to considerable accuracy, enables reasonable prediction of energy consumption for a typical year and allows calculation of energy consumption using minimal data and computer time. An algorithm can also be used to predict the performance of cooling equipment, engines and building temperatures. The basis for a weather algorithm, and data on average, minimum, and maximum daily temperatures for each month at various locations in New Zealand and on relative humidities are presented. T.M.

N82-28913# Boeing Engineering and Construction, Seattle, Wash.

WIND RESOURCE ANALYSIS FOR THE TENNESSEE VALLEY AUTHORITY REGION, VOLUME 1

Donald McGrew, Robert Nielsen, and Wayne Weisner Jun. 1981 146 p refs Sponsored in part by Tennessee Valley Authority, Chattanooga 4 Vol.
(Contract DE-AC06-76RL-01830)
(DE82-004927; TVA/OP/ECR-81/71-Vol-1) Avail: NTIS HC A07/MF A01

Background information on the geography, topography, and climate of the region, a summary of the wind resource, and assessments of the wind resource and energy production potential for specific sites in the region are presented. Information on the sources of meteorological data, and on the various types of summary tables and graphs that were produced to assess the wind resource is given. Results of the wind energy assessment for each site are summarized to provide an overview and description of the various features of the regional wind energy resource and the simulated energy production of two wind turbines rated at 2.5 megawatts and 65 kilowatts. Background on how the wind resource is assessed and on how the results of the assessments should be interpreted is given. The accuracy of the analysis, possible future improvements in data collection and recommendations on areas of the region that deserve further exploration are discussed. DOE

N82-28914# Boeing Engineering and Construction, Seattle, Wash.

WIND ENERGY RESOURCE ATLAS. VOLUME 2: TVA POWER SERVICE AREA

Donald McGrew, Robert Nielsen, and Wayne Weisner Jun. 1981 865 p refs Sponsored in part by Tennessee Valley Authority, Chattanooga 4 Vol.
(Contract DE-AC06-76RL-01830)
(DE82-004877; TVA/OP/ECR-81/71-Vol-2) Avail: NTIS HC A99/MF A01

Data summaries for Tennessee Valley Authority sites 1 through 20 are given. Each site has 19 graphs and 23 tables showing seasonal and annual variations in such parameters as wind velocity and wind direction. In addition to the graphs and tables, the data for each site are preceded by brief site notes. DOE

N82-28915# Boeing Engineering and Construction, Seattle, Wash.

WIND RESOURCE ANALYSIS FOR THE TENNESSEE VALLEY AUTHORITY REGION, VOLUME 3
Donald McGrew, Robert Nielsen, and Wayne Weisner Jun. 1981 839 p refs Sponsored in part by Tennessee Valley Authority, Chattanooga 4 Vol.
(Contract DE-AC06-76RL-01830)
(DE82-006196; TVA/OP/ECR-81/71-Vol-3) Avail: NTIS HC A99/MF A01

Data summaries for Tennessee Valley Authority TVA sites 21 through 47 are given. Each site has graphs and tables showing seasonal and annual variations of wind direction and velocity. Sites 32 through 38 have wind run data so only one table showing monthly variations of mean windspeed is given for each site. In addition to the graphs and tables, the data for each site is preceded by brief site notes. DOE

N82-28916# Boeing Engineering and Construction, Seattle, Wash.
WIND RESOURCE ANALYSIS FOR THE TENNESSEE VALLEY AUTHORITY REGION, VOLUME 4
Donald McGrew, Robert Nielsen, and Wayne Wiesner Jun. 1981 838 p refs Sponsored in part by Tennessee Valley Authority, Chattanooga 4 Vol.
(Contract DE-AC06-76RL-01830)
(DE82-005103; TVA/OP/ECR-81/71-Vol-4) Avail: NTIS HC A99/MF A01

Data summaries for Tennessee Valley Authority (TVA) sites 48 to 99, excluding sites 69-72 which were not assigned are given. TVA Sites 48-66 have graphs and tables showing seasonal and annual variations of wind parameters. Sites 67 and 68 only show the mean wind-speed on one summary page. Sites 73 to 99 are forest service sites that only had one observation per day, usually in the afternoon. Since there is no direction associated with the windspeed, there are only two graphs and two tables for each site showing variations of the mean windspeed. In addition to the graphs and tables, the data for each site is preceded by brief site notes. DOE

N82-28917# New York Univ., N. Y. Dept. of Applied Science.
GEOCHEMICAL AND GEOPHYSICAL MODELS OF THE FOSSILE-FUEL CO2 CLIMATE PROBLEM Semiannual Progress Report, 2 Feb. - 31 Aug. 1981
M. Hoffert and Warren Wiscombe 1981 26 p refs
(Contract DE-AC02-81EV-10610)
(DE82-005484; DOE/EV-10610/01) Avail: NTIS HC A03/MF A01

Efforts were directed towards development of a coupled ocean-atmosphere climate model. An important discovery was made with far-reaching implications for the CO2 problem; the evaporative constraint on tropical ocean temperature, when put into a climate model, yields much more realistic simulations than the current generation of energy-balance climate models are able to achieve. A summary of the model is presented. DOE

N82-28918# Stockholm Univ. (Sweden). Dept. of Meteorology.
THE ANNUAL VARIATION OF THE LARGE-SCALE 500 MB AND SEA LEVEL PRESSURE FIELDS
Harald Lejenaes and Roland A. Madden (International Meteorological Inst., Stockholm) 1 Mar. 1982 40 p refs Sponsored in part by NSF
(DM-35) Avail: NTIS HC A03/MF A01

Tables, providing information needed to generate mean large scale 500 mb height, temperature fields, or sea level pressure fields for each day of the year, are presented together with the FORTRAN program for reconstructing smooth maps. Data are drawn from 30 yr daily height and sea level pressure data, and 17 yr daily temperature data. Data were interpolated from the octagon to a 5x10 deg latitude-longitude grid from 20 to 80 deg N, using a 16 point interpolation routine. The data were then Fourier analyzed along each latitude line, retaining only the first six zonal wave numbers. Author (ESA)

N82-28919# Research Inst. of National Defence, Stockholm (Sweden).
FINE SCALE STRUCTURES IN TIME AND SPACE OF RAINFALL RATE
Sture Wickerts Mar. 1982 81 p refs
(Contract FMV-F-FR-84362-72-280)
(FOA-C-20448-E2) Avail: NTIS HC A05/MF A01

Data drawn from 3 year records of rainfall rate, collected to study atmospheric interference with electromagnetic wave propagation at frequencies above 10 GHz, are presented. Four case studies, representing days with the wind blowing parallel to the 15 km line where the rain gages were placed, from the south and from the north, as well as perpendicular to the line from the east and from the west, are given. Cross correlation of the four cases shows that the speed of propagation of showers is equal to the component of the wind velocity at 850 mb along the line. Author (ESA)

N82-28920# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Analysis and Prediction Div.
THE EFFECTS OF MOISTURE ON MOUNTAIN LEE WAVES Ph.D. Thesis - MIT
1981 146 p refs
(Grant NSF ATM-77-23757)
(PB82-156621; NCAR-CT-65) Avail: NTIS HC A07/MF A01 CSCL 04B

A numerical model was used to examine the impact of moisture on the dynamics of mountain lee waves. The model, which was originally designed to simulate convective storms, was modified for lee wave calculations and tested to verify its accuracy. The effects of moisture on trapped and propagating waves were considered separately. In both cases, the release of latent heat was found to significantly influence the wave dynamics. Author

N82-28921# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Analysis and Prediction Div.
LRIR OBSERVATIONS OF THE STRUCTURE AND PROPAGATION OF THE STATIONARY PLANETARY WAVES IN THE NORTHERN HEMISPHERE DURING DECEMBER 1975 Ph.D. Thesis - Drexel Univ.
William James Kohri 1981 335 p refs
(Grant NSF ATM-77-23757)
(PB82-156639; NCAR/CT-63) Avail: NTIS HC A15/MF A01 CSCL 04B

Statistical Kalman filter algorithm was implemented and tested for use in the construction of synoptic distributions of stratospheric field variables from asynoptic satellite data. The method provides for an interpolation in time as well as some degree of spatial smoothing. Test results showed that the filter algorithm was capable of poviding reliable daily estimates of planetary wave amplitude and phase for situations characterized by less than 100% satellite data recovery. When simulated satellite temperature observations were perturbed with realistic values of measurement noise, wave amplitudes were shown to be retrieved to within 1 degree K and wave phases were retrieved to within 10 degrees of longitude. Author

N82-28922# National Oceanic and Atmospheric Administration, Washington, D. C. Environmental Data and Information Service.
ENVIRONMENTAL SATELLITE IMAGERY, JULY 1981
Sep. 1981 69 p refs
(PN82-156894; KMRD-5.4-8107) Avail: NTIS HC A04/MF A01 CSCL 04B

Cloud data obtained by operational environmental satellites is described. Daily global satellite imagery in condensed form is presented as a guide and is designed to help users select data for research and climatological use. GRA

N82-28923# National Center for Atmospheric Research, Boulder, Colo.
SUMMER MONEX US RESEARCH FLIGHT MISSIONS, MAY - JULY 1979
William Bolhofer, Mary Chambers, Dean Frey, Joachim Kuettner, and Sushil Unninayar Jul. 1981 228 p
(Grant NSF ATM-77-23757)
(PB82-158718; NCAR/TN-168) Avail: NTIS HC A11/MF A01 CSCL 04B

This document provides scientific users and participants in the Summer Monsoon Experiment (SMONEX) with quick and concise information on the flight missions flown by the U.S.

research aircraft out of Dhahran, Saudi Arabia, Bombay, and Calcutta, India. The two main parts of the report are: (1) An atlas of flight tracks superimposed on DMSP satellite cloud images; (2) tabular data from all successfully launched dropwindsondes. GRA

N82-28924# National Center for Atmospheric Research, Boulder, Colo. Atmospheric Analysis and Prediction Div.
BOUNDARY SUBROUTINE FOR THE NCAR GLOBAL CLIMATE MODEL
Robert E. Dickinson, Jill Jager, Warren M. Washington, and Richard Wolski Jun. 1981 84 p refs
(Grant NSF ATM-77-23757)
(PB82-158742; NCAR/TN-173) Avail: NTIS HC A05/MF A01 CSCL 04B

The parameterizations of surface processes currently being used in the NCAR grid point general circulation model are summarized. Ground, snow sea ice surface temperature, soil moisture, evaporation, surface, and groundwater runoff are calculated. Vegetation cover in terms of fractional ground shading, relative area of transpiring, and nontranspiring plant surfaces, and land use type is specified. Author

N82-28925# National Center for Atmospheric Research, Boulder, Colo.
CIRCULATION STATICS FOR THE EXTRATROPICAL NORTHERN HEMISPHERE BASED ON NMC ANALYSES
Ngar-Cheung Lau (Washington Univ., Seattle), Glenn H. White (Washington Univ., Seattle), and Roy L. Jenne Apr. 1981 148 p refs
(Grant NSF ATM-77-23757)
(PB82-158759; NCAR/TN-171) Avail: NTIS HC A07/MF A01 CSCL 04B

Polar stereographic maps and meridonal cross sections of selected circulation statistics for the extratropical regions from 1000 to 100 mb (20-90 N) of the Northern Hemisphere are presented for winter and summer The statistics were calculated from twice daily gridded synoptic analyses produced by the U.S. National Meteorological Center on an operational basis for 11 winters (1965-66 to 1975-76) and 12 summers (1966 to 1977). GRA

N82-28926# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
FACE-2 DATA REDUCTIONS AND ANALYSES, PRIOR TO DISCLOSURE OF THE TREATMENT DECISIONS. PART 1: FACE-2 RAIN GAGE RAINFALL
Jack L. Thomas Oct. 1981 244 p refs
(PB82-163056; NOAA-TM-ERL-OWRM-6-Pt-1; NOAA-81120312-Pt-1) Avail: NTIS HC A11/MF A01 CSCL 04B

A complete summary of rain gage data for experimental days during the second phase of the Florida Area Cumulus Experiment (FACE-2) is presented. The rain gage data are summarized for three time groups for each gage for the 61 experimental days. Additional tables indicate rain gage data vailability for the months FACE-2 was conducted and summaries of analysis of FACE target area rainfall depths from rain gage data. Time profiles of half hour rain depths from digitized radar and rain gages are included for the target area from 0900 to 2100 EDT. The primary purpose of this report is to publish the FACE-2 rain gage data base that will be used in analysis of seeding effects before the seed decisions are disclosed. Author

N82-28927# National Weather Service, Silver Spring, Md.
OPERATIONS OF THE NATIONAL WEATHER SERVICE
1981 260 p refs
(PB82-161829; NOAA-81120704) Avail: NTIS HC A12/MF A01 CSCL 04B

The meteorological, hydrological, and oceanographic operations of the National Weather Service are described. The provisions of forecasts and weather warnings to the general public and specialized users is the heart of the NWS operations. Forecasts issued by the Weather Service Forecast Offices include State, zone, local, agricultural, environmental quality, marine and other specialized forecast products. Warnings are issued for severe weather such as hurricanes, tornadoes, severe thunderstorms, flash floods and extreme winter weather. GRA

N82-28928# National Center for Atmospheric Research, Boulder, Colo. Convective Storm Div.
CASE STUDIES ON CONVECTIVE STORMS, CASE STUDY 10, 22 JULY 1975: MATURE STORM STUDY: A CONCEPTUAL MODEL SYNTHESIZED FROM MICROPHYSICAL AND DYNAMIC OBSERVATIONS OF A MULTICELL THUNDERSTORM
Wayne R. Sand (Wyoming Univ., Laramie) Nov. 1981 280 p refs
(Grant NSF ATM-77-23757)
(PB82-159567; NCAR/TN-184) Avail: NTIS HC A13/MF A01 CSCL 04B

A complex multicell thunderstorm was penetrated with the armored T-28 aircraft. The T-28 carried a comprehensive suit of instruments to measure specific, critical parameters in the thunderstorm. Evidence exists for the recirculation of ice crystals in areas of subjued convection and downdrafts to allow time for growth of cloud elements to hall embryo sizes followed by subsequent diffusion into updraft areas where the ingredients for rapid growth of these embryos to hail sizes exist. Author

N82-28929# National Center for Atmospheric Research, Boulder, Colo.
WINTER MONEX US RESEARCH FLIGHT MISSIONS, DECEMBER 1978
William Bolhofer, Mary Chambers, Dean Frey, Joachim Kuettner, and Sushil Unninavar Jul. 1981 95 p refs
(Grant NSF ATM-77-23757)
(PB82-158767; NCAR/TN-167) Avail: NTIS HC A05/MF A01 CSCL 04B

Information from the flight missions flown by the reseach aircraft out of Kuala, Lumpur, Malaysia is presented. An atlas of flight tracks superimposed on DMSP satellite cloud images and tabular data from all successfully launched dropwindsondes are included. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N82-28930# Coast Guard, Washington, D.C. Oceanographic Unit.
PACIFIC AREA CURRENT CHARTS
Kenneth A. Mooney and Alan D. Summy 1982 71 p refs (AD-A112293; TR-82-2) Avail: NTIS HC A04/MF A01 CSCL 08/3

A monthly mean sea current was calculated for the west coast of the United States and the Hawaiian Islands area on a spatial grid of 1 deg by 1 deg. These mean geostrophic velocities were computer generated from dynamic height data obtained from the National Oceanographic Data Center. A method employing two-dimensional spline fits of spatially and temporally random hydrographic data was developed to determine the monthly averaged geostrophic currents. Author (GRA)

N82-28931# Texas Univ., Austin. Applied Research Labs.
AMBIENT NOISE IN THE WESTERN GULF OF MEXICO
Jack A. Shooter, Thomas E. DeMary, and Robert A. Koch 11 Mar. 1982 35 p refs
(Contract N00014-82-C-0049)
(AD-A114126; ARL-TR-82-15) Avail: NTIS HC A03/MF A01 CSCL 20/1

A brief 12 h segment of ambient noise from the Western Gulf of Mexico for a clear, calm period has been analyzed. The receiver depths were 170 m, 370 m, and 766 m; the bottom was at 3280 m. It was found that the ambient noise was dominated most of the 12 h by seismic exploration. To avoid this noise, quiet periods between seismic domination were used; the median noise levels at 50 Hz were found to be around 75-77 dB//1 micro Pa/sq root(Hz) with the slightly higher levels at the SOFAR channel axis. Overall median levels were 77-80 dB//1 micro Pa/sq root(Hz). These levels are lower than the 85 dB levels for the Atlantic near Bermuda. Author (GRA)

N82-28932# Control Data Corp., Monterey, Calif.
USERS MANUAL FOR POLAR ICE FORECAST SUBSYSTEM: ARCTIC
P. A. Harr Oct. 1981 18 p refs
(Contract N00014-81-F-0028)
(AD-A114351; NORDA-TN-121) Avail: NTIS HC A02/MF A01 CSCL 08/12

The objective of the Users Manual for the Polar Ice Forecast Project Subsystem - Arctic is to provide the users non-ADP personnel with the information necessary to effectively use the system. GRA

N82-28933# Control Data Corp., Monterey, Calif.
PROGRAM MAINTENANCE MANUAL POLAR ICE FORECAST SUBSYSTEM: ARCTIC
P. A. Harr, T. C. Pham, and J. P. Welsh Oct. 1981 146 p refs
(Contract N00014-81-F-0028)
(AD-A114343; NORDA-TN-122) Avail: NTIS HC A07/MF A01 CSCL 08/12

This manual provides a complete and detailed description of the dynamic thermodynamic sea ice model (PIFS-N) including all the necessary information for maintenance programmer personnel required to maintain the system. Author (GRA)

N82-28934# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Ocean Science and Technology Lab.
OCEAN CURRENT EFFECTS ON MARINE SEISMIC SYSTEMS AND DEPLOYMENTS Final Report
Janice D. Boyd Jan. 1982 45 p refs
(AD-A114135; NORDA-TN-132) Avail: NTIS HC A03/MF A01 CSCL 08/3

Upper level and near bottom current measurements were made near DSDP Hole 395A (22 degs. 45'N, 46 degs. 10'W) in March-April 1981 in support of the at-sea test of the Marine Seismic System Project. Four upper ocean current profiles were made during initial deployment of the borehole seismometer. Readings were noticeably contaminated by ship motion, but clearly indicated a variable yet generally slow current regime which posed minimal threat of cable entanglement. Current measurements made 5 m off bottom during seismometer testing showed marked spectral peaks at semidiurnal and inertial frequencies. Mean speed of 4.4 cm/sec and maximum speed of 9 cm/sec were low but possibly of sufficient magnitude to cause contamination of concurrently deployed ocean bottom seismometer records with hydrodynamically generated noise. Other studies have confirmed noise contamination of OBS records by near bottom currents, with a possible 10 cm/sec threshold for its importance. While methods to detect and eliminate the noise might be developed, instrument testing and redesign to reduce sensitivity to contamination is probably wiser. GRA

N82-28935# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Oceanography Div.
OCEAN ALTIMETRY ALGORITHMS STATUS: MARCH 1982
Matthew Lybanon Apr. 1982 16 p refs
(AD-A114325; NORDA-TN-146) Avail: NTIS HC A02/MF A01 CSCL 08/3

The GEOSAT satellite, to be launched in FY-84, will carry a microwave altimeter. NORDA has responsibility for implementing an operational demonstration at Fleet Numerical Oceanography Center (FNOC) in which oceanographic products utilizing information obtained from the altimeter are the result. Substantial preparation will be required. This note outlines the current status of available processing algorithms. Existing software that was used for SEASAT forms a starting point; that software and its limitations are reviewed. The SEASAT software as used did not take advantage of (or test) its full design capabilities, primarily because of the shortness of the mission and because certain information was unavailable. Current studies that build on newer developments in the interpretation of altimeter data are also described, along with a summary of background material. Some of the new studies are directed specifically toward the detection and monitoring of mesoscale features, which will be a goal of the operational demonstration and which was not a part of the routine SEASAT processing. The results of the ongoing studies will clarify the scope of the required algorithm development effort. Author (GRA)

N82-28936# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
SURFACE STRESS ESTIMATION FOR STUDY OF THE CIRCULATION DYNAMICS OF THE GULF OF MEXICO
J. V. Ramsdell (Battelle Pacific Northwest Lab.) and J. Dana Thompson Jul. 1981 21 p refs
(AD-A114349; NORDA-TN-113) Avail: NTIS HC A02/MF A01 CSCL 04/2

This report presents the results of a literature search concerning estimation of wind stress over large bodies of water and an evaluation of several sets of stress estimates for the Gulf of Mexico. Wind stress can be estimated directly from wind observations or indirectly from atmospheric pressure by using the pressure gradients and the geostrophic relation. In regions where wind data are sparse, as in the Gulf of Mexico, the use of the indirect method is more practical. The major problems considered in stress estimation are: treatment of the drag coefficient that relates wind to stress, spatial and temporal averaging of the data before and after making stress estimates, and empirical corrections to be applied to winds computed from pressure gradients. GRA

N82-28937# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Oceanography Div.
MEASUREMENTS OF WHITECAP COVERAGE AND SURFACE WINDS OVER THE GULF OF MEXICO LOOP CURRENT
Peter M. Smith Oct. 1981 28 p refs
(AD-A114429; NORDA-43) Avail: NTIS HC A03/MF A01 CSCL 08/3

The fraction of the ocean surface covered by whitecaps has long been thought to be some monotonically increasing function of the prevailing wind velocity at least for large fetches. In order to determine the extent to which other factors such as air column stability or water mass type can influence the areal coverage of whitecaps, photographic data was collected over the Loop Current from a NAVOCEANO P-3 aircraft. The variation of whitecap coverage along a line of closely spaced (25 km) stations was determined and compared with other aircraft and data buoy information. The data indicates that, on the day of the flight, white-capping within the boundaries of the Loop Current depended little on the local wind, but demonstrated a noticeable dependence on air column stability. The strength and nature of this dependence varied over mesoscale distances. These results indicate that microwave radiometric measurements can be sensitive to variables other than surface wind since microwave brightness is quite sensitive to sea foam. The value of areal whitecap coverage as a measurable geophysical variable is also examined. GRA

N82-28938# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Ocean Science and Technology Lab.
GEOLOGY RELATED TO ACOUSTIC TRANSMISSION: EASTERN CARIBBEAN
Anna M. Einwich Jan. 1981 23 p
(AD-A114430; NORDA-28) Avail: NTIS HC A02/MF A01 CSCL 08/10

Geologic characteristics of the ocean floor can produce measurable effects on sound speed. Of significance are the intrinsic properties of sediments, their depth of burial, degree of consolidation, and temperature. Roughness of the sea floor can also affect sound transmission. The series of maps in this report depict sound velocities beneath the eastern Caribbean as they vary both horizontally and vertically with geological variations in the sea floor, together with the areal distribution of other important geological factors which affect sound speed. A brief discussion of each map is included in the text. Other important geologic factors which affect sound speed can be encountered at or near the surface of the sea floor; their distribution is shown on the remaining maps. GRA

N82-28939# Naval Research Lab., Washington, D. C.
PRELIMINARY RESULTS OF LINE SENSOR TEST Interim Report
W. D. Morris, J. P. Dugan, and B. W. Stalcup 13 May 1982 28 p refs

(AD-A114313; NRL-MR-4798) Avail: NTIS HC A03/MF A01 CSCL 08/3

A major source of contamination of internal wave information obtained from towed temperature data is due to fine structure in the mean vertical profile. This fine structure is being studied with a dense array of thermistors comprising a line sensor, and the initial test of this line sensor with a real time analysis of its performance is the subject of this memorandum. Data from two deployments at sea are examined for signal noise level and for initial estimates of auto-and cross-spectral content.

Author (GRA)

N82-28940# California Univ., Berkeley. Lawrence Berkeley Lab. Marine Sciences Div.

MARINE SCIENCES GROUP Annual Report, 1980

Nov. 1981 37 p refs

(Contract W-7405-eng-48)

(DE82-005145; LBL-13579) Avail: NTIS HC A03/MF A01

The biological research includes site surveys and bioassays of organisms and studies of the toxicity of ammonia and chlorine. The chemistry program involves OTEC site characterization, a nutrient preservation study, and a radioactive tracer development program for mixing studies and a program examining the partitioning of trace metals in the water column. The geological research included archival studies of bathymetry, and paleo-oceanographic modeling to explain organically rich sediments. The physical research addresses ocean currents. DOE

N82-28941# Woods Hole Oceanographic Institution, Mass.

COASTAL-SHELF TRANSPORT AND DIFFUSION Annual Progress Report, 1981

G. T. Csanady Nov. 1981 11 p refs

(Contract DE-AS02-79EV-10005)

(DE82-005474; DOE/EV-1005/07) Avail: NTIS HC A02/MF A01

Theoretical and observational studies of the physics of continental shelf circulation, the mechanics of the coastal boundary layer, and the pathways of mass exchange between the coastal waters and the deep sea are discussed. Attempts were also made to develop the engineering science of pollution prediction under the complex circumstances prevailing in the coastal ocean. The dynamics of shelf circulation, coastal boundary layers the water side of the air-sea interface, the disposal of contaminants, and cross-shelf mass exchange, are discussed. DOE

N82-28942# Woods Hole Oceanographic Institution, Mass.

RADIOELEMENT STUDIES IN THE OCEANS Progress Report, 15 Apr. 1981 - 14 Apr. 1982

V. T. Bowen, H. D. Livingston, J. K. Cochran, E. R. Sholkovitz, and M. R. Hess Nov. 1981 79 p refs

(Contract DE-AC02-81EV-10694)

(DE82-003705; DOE/EV-10694/T1) Avail: NTIS HC A05/MF A01

Cruise reports and sampling activities; abstracts of reports published, submitted, or presented at meetings; and brief summaries of work in progress are presented. Research in progress includes the following studies: post-depositional chemistry of radionuclides: interstitial water composition laboratory remobilization studies; thorium isotope studies in seawater; radionuclide measurements on samples from ocean weather ship MIKE, in the Norwegian Sea; counting technique optimization for Cs isotopes collected by chemisorption; Pu oxidation states in the Aleutian Trench water column; intercalibrations and standard materials; and radionuclides in deep water bathypelagic biota.

DOE

N82-28943# Woods Hole Oceanographic Institution, Mass.

THE DYNAMICS OF MEAN CIRCULATION ON THE CONTINENTAL SHELF Ph.D. Thesis - Massachusetts Inst. of Tech.

Ping-Tung Peter Shaw Jan. 1982 230 p refs

(Contract DE-AC02-79EV-10005)

(PB82-157082; WHOI-82-1) Avail: NTIS HC A11/MF A01 CSCL 08C

Mean long-isobath drift of the order 5 cm/sec in a monthly or seasonal scale has been observed over the continental shelves in the Middle Atlantic Bight, in the Adriatic Sea, and in the Weddell Sea. A theoretical model is developed to explore the driving mechanism of this mean circulation analytically and numerically. Model solutions show that the steep bottom topography over the continental slope plays an important role in the shelf circulation. It not only reduces the magnitude of the flow response to wind forcing on the slop but shields the deep ocean circulation from the continental shelf. Under density forcing, the interaction between long isobath near bottom density variations and bottom topography results in unsteady self advection of density perturbations produced by density flux from the atmosphere and rivers. GRA

N82-28944# National Oceanic and Atmospheric Administration, Seattle, Wash. Marine Environmental Lab.

VERTICAL SECTIONS OF TEMPERATURE, SALINITY, THERMOSTERIC ANOMALY AND ZONAL GEOSTROPHIC VELOCITY FROM NORPAX SHUTTLE EXPERIMENT, PART 1

Bruce A. Taft and Paavo Kovala (Washington Univ.) Jul. 1981 103 p refs

(Grants NSF OCE-78-20719; NSF OCE-80-24913)

(PB82-163106; NOAA-DR-ERL-PMEL-3; NOAA-81120313) Avail: NTIS HC A06/MF A01 CSCL 08J

The NORPAX Hawaii-Tahiti Shuttle Experiment was carried out in the central Pacific. This report covers CTD profiling data from the first five legs of this Shuttle. Vertical sections of temperature, salinity, thermosteric anomaly and zonal geostrophic velocity are presented. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N82-28945# Letterman Army Inst. of Research, San Francisco, Calif.

DOMESTIC SWINE IN PHYSIOLOGICAL RESEARCH. 3: BLOOD GAS AND ACID-BASE VALUES OF ARTERIAL AND VENOUS BLOOD FROM YOUNG ANESTHETIZED PIGS MAINTAINED UNDER STEADY-STATE VENTILATORY CONDITIONS Interim Report, Jun. - Dec. 1981

John P. Hannon and William Y. Moores Feb. 1982 35 p refs

(DA Proj. 3M1-61102-BS-10)

(AD-A111834; LAIR-113) Avail: NTIS HC A03/MF A01 CSCL 06/16

The arterial and venous blood gas and acid-base characteristics of anesthetized, young domestic swine were determined under steady-state ventilatory conditions designed to establish arterial P O2 at 100 torr and pH at 7.40. Under these circumstances, mean (N = 15) femoral artery values were: P O2, 97 torr; S O2, 94%; C O2, 15.4 ml/dl; pH, 7.399; P CO2, 47 torr; (HCO3), 27.6 mEq/1; and (B.E.), 2.8 mEq/1. Values for pulmonary artery, mixed venous blood were: P O2, 36 torr; SaO2, 51%; C O2, 8.5 ml/dl; pH, 7.335; P CO2, 57 torr (HCO3), 29.6 mEq/1; and (B.E.), 3.9 mEq/1. Comparisons of venous values obtained from various vascular sites (pulmonary artery, anterior vena cava, posterior vena cava, internal jugular vein, femoral vein and coronary sinus) revealed numerous between-vessel differences in blood gas and acid-base status. The arterial characteristics of this anesthetized preparation differed from those of the conscious pig; the anesthetized animal had lower pH, (HCO3) and (B.E.) values and higher P O2 and P CO2 values than the conscious animal. Anesthesia with mechanical ventilation appeared to produce defects in alveolar-arterial gas exchange similar to those reported for other species. The anesthetized pig, nevertheless, can serve as an effective biomedical model for human oriented research. Author (GRA)

N82-28946# Letterman Army Inst. of Research, San Francisco, Calif.

LONG-TERM AND PROGRESSIVE CHANGES IN RHESUS SPECTRAL SENSITIVITY AFTER LOW-LEVEL COHERENT LIGHT (514nm EXPOSURE) Technical Note, 1978 - 1980

Harry Zwick, Edwin S. Bratrice, and Thomas A. Garcia Dec. 1981 17 p refs

(AD-A111639; LAIR-81-19TN) Avail: NTIS HC A02/MF A01 CSCL 06/18

Although present laser safety standards are based on an adequate data base for acute viewing situations, they are limited in predicting the type of change in visual function that might be induced from prolonged or repetitive viewing of laser sources. Viewing requirements in holography, laser display systems, and in general, repeated exposure to low levels of laser radiation require a more complete data base for optimizing the environmental protection of individuals who will be required to work in such environments. In these studies, we have simulated very low-level radiation environments and determined the effects of repetitive prolonged exposure on the visual function of the of the Rhesus. Our data suggest that prolonged viewing of such sources, even though they are well below present laser safety standards, can produce permanent changes in visual processes that underline normal human day (photopic) and night (scotopic) vision. Studies of morphology have shown possible subtle morphological correlate. The coherency of laser light is implicated as a significant factor in inducing these effects. It is recommended that individuals required to work in these situations be frequently evaluated for changes in visual function by presently available clinical instruments for assessment of visual function. Further confirmation of these studies will determine the impact of these research findings on present laser safety standards. GRA

N82-28947# Puerto Rico Univ., Mayaguez. Center for Energy and Environment Research.

OTEC BIOFOULING, CORROSION, AND MATERIALS STUDY FROM A MOORED PLATFORM AT PUNTA TUNA, PUERTO RICO

D. S. Sasscer, T. R. Tosteson, and T. O. Morgan Aug. 1981 126 p refs Prepared for ANL, Ill.
(Contract W-31-109-eng-38)
(DE82-007037; ANL/OTEC-BCM-023) Avail: NTIS HC A07/MF A01

A biofouling test of periodically cleaned, OTEC evaporator tubes was conducted. The fouling resistance, total surface carbon and nitrogen content, ATP, and the wet film thickness (WFT) were determined throughout the test. Visual observations of the fouling film were made by light sectioning and scanning microscopy, and at the end of the test, a study was made of the macrofouling of the flow system. The results of the tests indicate that a base layer of bacteria and exudated polysaccharides enhance microbial adhesion and thereby create an environment conducive to rapid film growth. Fouling rates for aluminum were generally higher than for titanium but they were linear for both materials. Excellent correlation was found to exist between R/sub f and WFT which supports the hypothesis that it is the stagnant film of water entrapped by bacteria which is largely responsible for the insulating properties of the biofilm. The macrofouling study identified 61 species of benthic invertebrates representing ten phyla growing in those parts of the flow system, where flow was less than 3 fps but no macrofouling where the flow velocity significantly exceeded 3 fps. DOE

N82-28948# National Inst. for Metallurgy, Randburg (South Africa).

THE ORGANIZING OF CONFERENCES

L. F. Haughton 18 Sep. 1981 18 p refs
(PB82-142696; NIM-2130; ISBN-0-86999-556-1) Avail: NTIS HC A02/MF A01 CSCL 05A

The Liaison and Information Division of the National Institute for Metallurgy (NIM) has been concerned in the planning and organizing of conferences, local and international, large and small, for many years, and as the result of trial and error has acquired a fair amount of knowledge of the subject and developed a successful modus operandi. It is felt that the knowledge and expertise gleaned over the years should be made available generally for use by interested organizers. GRA

N82-28949# Joint Publications Research Service, Arlington, Va.

USSR REPORT. SPACE BIOLOGY AND AEROSPACE MEDICINE, VOLUME 16, NO. 3, MAY - JUNE 1982

O. G. Gazenko, ed. 2 Jul. 1982 155 p refs Transl. into ENGLISH of Kosm. Biol. Aviakosmicheskaya Med. (USSR), 1982
(JPRS-81197) Avail: NTIS HC A08

The effects of weightlessness and acceleration on the physiology of man were studied. The heart was studied in relation to the effects of long term spaceflight, circadian rhythms, and external conditions. Different aspects of blood circulation and motion sickness were studied. For individual titles, see N82-28950 through N82-28976.

N82-28950# Joint Publications Research Service, Arlington, Va.

PROBLEM OF ACCELERATIONS IN AVIATION MEDICINE **c52**

P. V. Vasilyev and S. A. Gozulov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 2 Jul. 1982 p 1-6 (JPRS 81197) refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 4-7 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

The problem of effects of accelerations on an organism, particularly on a pilot's work capacity is discussed. Further increase in the body's resistance to accelerations and, consequently, increase of pilot's work capacity are emphasized. The increasing diversity of inflight tasks and complexity of interaction in the pilot-aircraft-environment system make it imperative to examine many physiological questions from the standpoint of the systems approach and with consideration of ergonomic aspects of this problem. The accelerations inherent in aircraft flights are divided into two main types: prolonged (piloting), which occur when maneuvering the aircraft, and impact, which occur during ejection, opening of the parachute, landing of the pilot, as well as forced ('rough') landings of the aircraft. The effects of these accelerations on pilots differ appreciably. S.L.

N82-28951# Joint Publications Research Service, Arlington, Va.

SLEEP, CIRCADIAN CYCLES OF PHYSIOLOGICAL FUNCTIONS AND PARAMETERS OF HUMAN WORK CAPACITY ON FIRST DAY AFTER CHANGING FROM ALTERED TO USUAL SLEEP-WAKING CYCLE **c52**

A. N. Litsov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 7-14 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 8-13 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

Twelve male test subjects, aged 28 to 40, took part in studies, in which a normal work-rest cycle was preceded by three types of an altered cycle, to investigate their adaptation reactions. The return to the normal work-rest cycle was accompanied by slight changes in physiological functions, work capacity and sleep patterns. The level of these changes was correlated with the type of altered work-rest cycles and with the degree of men's adaptation to them. The return to the normal work-rest cycle proceeded more readily, if adaptation to an altered cycle was incomplete. The required level of work capacity of men that have to vary their work-rest cycles frequently can be maintained by short term (for 1 to 3 days) cycle alterations. S.L.

N82-28952# Joint Publications Research Service, Arlington, Va.

ROLE OF HORMONAL COMPOUNDS IN REGULATION OF ELECTROLYTE METABOLISM IN THE PRESENCE OF EMOTIONAL STRESS **c52**

B. B. Afonin, L. L. Orlov, N. F. Kalita, T. A. Viting, and R. A. Tigranyan *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 15-19 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 13-16 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

The emotional stress simulated by examinations taken by medical students led to a decrease of socium concentration in blood. A simultaneous increase of mineralocorticoids and a decrease of glucocorticoids was responsible for the sodium concentration in the blood. Both inhibition of glucocorticoids and stimulation of mineralocorticoids were associated with a high activity of plasma renin and a low concentration of adrenocorticotropic hormone. S.L.

N82-28953# Joint Publications Research Service, Arlington, Va.

METABOLIC DISTINCTIONS RELATED TO INTAKE OF LOW-CALORIE 'SURVIVAL' RATIONS CONSISTING ONLY OF READILY ASSIMILATED CARBOHYDRATES c54

I. G. Popov, P. A. Lozinskiy, A. A. Latskevich, and I. A. Romanova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 20-31 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 16-25 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Carbohydrate, mineral, amino acid, nitrogen metabolism, nutritional status and general health condition of test subjects were studied. In the case of an emergency landing in an area with a temperate climate, a contingency diet consisting of 300 g of readily assimilable disaccharides can be consumed for 5 days. S.L.

N82-28954# Joint Publications Research Service, Arlington, Va.

DYNAMICS OF LEFT VENTRICULAR SYSTOLIC PHASE STRUCTURE DURING LONG-TERM (140-185 DAYS) SPACEFLIGHTS c52

A. P. Polyakova, A. D. Yegorov, and I. V. Alferova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 32-38 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3,, May - Jun. 1982 p 25-30 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Kinetocardiographic studies of the left ventricular systolic time intervals at rest in spaceflights of 140, 175, and 185 days in duration revealed functional changes reflecting cardiovascular adaptation to weightlessness. The typical changes were: shortening of isometric contraction, decrease of the tension index, irregular decline of the ejection time, and a slight increase in the intrasystolic index. These changes in the systolic time intervals are indicative of an enhanced strength of cardiac contraction. This may in turn be associated with cephalad fluid shifts and reduced activity of the peripheral muscular heart. S.L.

N82-28955# Joint Publications Research Service, Arlington, Va.

SLOW WAVES OF CARDIAC RHYTHM IN HEALTHY MAN UNDER DIFFERENT CONDITIONS c52

A. N. Karpov and L. A. Zinovyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-8197) 2 Jul. 1982 p 39-42 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 30-32 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

The slow waves of the cardiac rhythm were investigated at rest and under emotional and physical stress. In most test subjects emotional stress led to the generation of the first order slow waves of 0.04-0.09 cps, whereas exercises inhibited slow waves of the above frequency range. Heart rate increased in response to both emotional and physical stress. The slow wave responses are used to evaluate the emotional status and to differentiate emotional and physical stress. S.L.

N82-28956# Joint Publications Research Service, Arlington, Va.

SYNCHRONIZATION OF CARDIOVASCULAR ACCIDENTS WITH PHYSICAL CLOCKS c52

R. M. Arslanova, V. N. Benevolenskiy, N. G. Ptitsyna, and K. A. Trukhanov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 43-47 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 32-34 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

The frequency of cardiovascular catastrophes (daily mortality rate of patients with ischemic heart disease), heliogeomagnetic activity (solar radiation in the wave band 10.7 cm, H, D and Z components of the geomagnetic field), synchronization and desynchronization of circaseptidian rhythms, and total number of cardiovascular catastrophes in different seasons are correlated. The raw data sets were treated with due account of the discrete pattern of random sequences and noise in the medical data set, finite analysis interval and informativity of the derivatives of the parameters used. The occurrence of cardiovascular catastrophes showed circaseptidian rhythms whose level depend on the above three factors. The results obtained are discussed with respect to possible synchronization and desynchronization of endogenous biorhythms by time cues, relating them to the mechanism of human adaptation to the environment. S.L.

N82-28957# Joint Publications Research Service, Arlington, Va.

REGULATION OF CEREBRAL CIRCULATION IN ERECT POSITION c52

V. S. Shubin, V. L. Anzimirov, Ya. K. Gasanov, and V. N. Korniyenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 48-55 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 35-40 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

The functional mechanisms responsible for orthostatic tolerance of cerebral circulation in the normal man and in ambulatory and bedridden neurosurgical patients were investigated, using the following methods: cerebral serial angiography, measurement of cerebral blood flow by means of xenon 133 clearance, measurement of brain perfusion pressure, ventricular pressure, acid base equilibrium in the blood flowing in and out of the brain, determination of cardiac output and stroke volume, electroencephaloraphy, and rheography of cerebral and peripheral vessels. In the normal men and patients with compensated neurosurgical pathologies, the transfer into the head up position induced small changes in the systemic and cerebral regional circulation. This was associated with complex reactions of the vascular system triggered by the receptors of the sinocarotid area. S.L.

N82-28958# Joint Publications Research Service, Arlington, Va.

ENDURANCE OF +Gz G FORCES BY MIDDLE-AGED PEOPLE BEFORE AND AFTER 7-DAY IMMERSION c52

A. R. Kotovskaya, I. F. VilVilyams, V. I. Zborovskaya, V. G. Andreyeva, O. L. Golovkina, T. N. Krupina, Kh. Kh. Yarullin, and N. P. Artamonova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 56-60 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 40-43 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Before and after 7 day immersion G sub z for 60 sec in a centrifuge with an arm of 7.25 m. The runs were repeated 12 times. The test subjects tolerated the exposure before and after immersion. However, after immersion the physiological systems functioned in a more stressful manner than prior to immersion. This is attributed to the deconditioning caused by simulated weightlessness. The comparison of the experimental findings with the literature data gives evidence that the pattern and level of physiological changes induced by an exposure to +3 G sub z for 60 sec in the test subjects, aged 41 to 49, do not differ significantly from those in younger (aged 23 to 36) people. S.L.

N82-28959# Joint Publications Research Service, Arlington, Va.

HUMAN EXTERNAL RESPIRATION AND GAS EXCHANGE IN ACUTE PERIOD OF ADAPTATION TO IMMERSION IN WATER c52

O. L. Golovkina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1082 (JPRS 81197) 2 Jul. 1982 p 61-65 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 43-46 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Responses of respiration and gas exchange of 6 test subjects to 3-day dry immersion were investigated. It was found that an exposure to immersion was accompanied by decreases in respiratory volume, vital lung capacity, maximum pulmonary

ventilation, and breathing time retention during inhalation and expiration. These changes were paralleled by an increase in the portion of the functional dead space and a decrease in the portion of the efficient alveolar volume. The permeability of respiratory tracts remained unchanged. These changes seem to be of the type of total respiratory insufficiency induced by circulatory disorders. This may be one of the factors responsible for a decline in human tolerance to exercises and acceleration applied after an exposure to simulated weightlessness. Author

N82-28960# Joint Publications Research Service, Arlington, Va.

REACTION TO DIMINISHED CIRCULATING BLOOD VOLUME IN INDIVIDUALS WHO ARE SUSCEPTIBLE AND INSUSCEPTIBLE TO MOTION SICKNESS (SEASICKNESS) **c52**

V. G. Isupov, D. G. Maksimov, and B. I. Polyakov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 66-70 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 46-49 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

The study of 54 healthy male test subjects demonstrated significantly different responses of motion sickness susceptible and resistant people to 10 minute occlusion of their femoral veins. The changes in limb rheograms, as well as heart rate and stroke volume indicated that in motion sickness susceptible subjects the circulating blood volume in the upper body decreased, whereas in motion sickness resistant subjects it remained unaltered or increased in response to the occlusion. Author

N82-28961# Joint Publications Research Service, Arlington, Va.

EFFICACY OF KAVINTON IN PREVENTION OF MOTION SICKNESS **c52**

D. Bodo, A. R. Kotovskaya, R. R. Galle, L. N. Gavrilova, G. A. Gusakova, and V. A. Smirnov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 71-74 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 49-51 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

During the study 8 motion sickness susceptible test subjects were kept in a chamber rotating at a rate of 6 rpm for 5 hours. The effectiveness of the drug taken regularly during the exposure was compared with that of scopolamine and placebo taken as a single dose. The results obtained are suggestive of a positive effect of kavinton as an antimotion drug. T.M.

N82-28962# Joint Publications Research Service, Arlington, Va.

NYSTAGMOMETRY OF OPTOVESTIBULAR INTERACTION **c52**

M. M. Levashov and A. I. Tumakov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 75-80 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 51-55 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Nystagmograms recorded in healthy people (270 ENG from 30 children, aged 3 to 7) were analyzed quantitatively. The velocity of the slow component of the vestibular nystagmus during caloric tests, optokinetic nystagmus in response to stimul applied at 20 and 10 deg/sec, as well as vestibulooptokinetic nystagmus resulting from modulation of he optokinetic nydtagmus due to the inhibitory or enhancing effect of caloric stimulation, were measured. The modulation level, i.e., the change of the velocity of the slow component that accompanied the transition of the optokinetic nystagmus to the vestibulo-optokinetic nystagmus, was always less than that of the vestibular nystagmus. This disagrees with the concept about algebraic summation of intensities of the reactions. The modulation level showed a low correlation with the vestibular nystagmus slow component velocity and depended on the optokinetic nystagmus velocity. Author

N82-28963# Joint Publications Research Service, Arlington, Va.

EFFECT OF CALORIC STIMULATION OF VESTIBULAR SYSTEM ON HEARING **c52**

G. P. Tsurikova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 81-86 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 55-58 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Changes of bone-conduction thresholds for tonal signals (250 and 2000 Hz) in each ear due to caloric vestibular tests were studied in 60 healthy test subjects (32 men and 28 women). These changes were found in 48 subjects. In most cases perceptual thresholds decreased (by 7.3 dB on the average) and in few cases increased (by 8.3 dB on the average). The sign of alteration was independent of the tonal signal frequency or the side exposed to the vestibular test or the number of examinations. The threshold returned to the norm for a long time (30 min or more). These findings suggest that the interaction may be governed by the principles that function in other sensory systems. It is recommended to carry out audiological examinations prior to vestibular tests in order to avoid distortions of the results. Author

N82-28964# Joint Publications Research Service, Arlington, Va.

POSSIBLE IMPAIRMENT OF RESPIRATORY REGULATION UNDER HYPERBARIC NITROGEN NARCOSIS **c52**

L. A. Bryantseva, A. V. Suvorov, and I. S. Breslav *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 87-90 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 59-61 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Nitrogen narcosis was simulated by nitrous oxide. The ventilation increment was measured as a function of an increase of the hypercapnic stimulus. A combination of high degree of hypercapnia and the narcotic effect may lead to ventilation inhibition and respiration disturbance. T.M.

N82-28965# Joint Publications Research Service, Arlington, Va.

MITOTIC ACTIVITY AND VOLUME OF EPITHELIAL CELL NUCLEI OF RAT CORNEA FOLLOWING SPACEFLIGHTS IN BIOSATELLITES

F. V. Sushkov, S. V. Rudneva, N. G. Sepetova, and Z. Ye. Vnukova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 91-98 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 61-66 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

The following parameters of the epithelial mitosis were studied: mitotic index, ratio of mitotic phases, number of abnormalities of cell division, and number of chromosome aberrations in anaphases. These parameters are considered to be indicators of physiological regeneration. The nuclear volume of cells of two inner epithelial layers was measured, using a modified karyometric technique that yielded representative data. The lack of significant changes in the above mitotic parameters can be attributed either to the absence of a strong stress-reaction of rats postflight or to the discrepancy between the time of animal sacrifice and the time of the maximum post-stressor inhibition of mitotic activity. T.M.

N82-28966# Joint Publications Research Service, Arlington, Va.

CATECHOLAMINES AND ENZYMES OF THEIR METABOLISM IN RAT MYOCARDIUM AFTER FLIGHT ABOARD THE COSMOS-936 BIOSATELLITE

R. Kwetnianski, R. A. Tigranyan, and T. Torda *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3 May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 99-102 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 66-68 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

In the myocardium of the weightless and contrifuged rats flown for 18.5 days onboard the biosatellite Cosmos-936 the catecholamine concentration and activity of enzymes involved in their synthesis and degradation, dopamine-beta-hydroxylase, monoamine oxidase and catechol-0-methyl transferase, were measured. The catecholamine concentration in the myocardium of both flight groups significantly increased, and the enzyme activity did not change. These results suggest that an exposure to space flight increases the catecholamine concentration and exerts no effect on their synthesis and degradation in the rat myocardium. Author

N82-28967# Joint Publications Research Service, Arlington, Va.

NITROGEN COMPOUND LEVELS IN TISSUES OF RAT CEREBRAL HEMISPHERES AND CEREBELLUM AFTER FLIGHT ABOARD COSMOS-1129 BIOSATELLITE

L. M. Kurkina and R. A. Tigranyan *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 103-106 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 68-70 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

The content of ammonia, glutamine, urea, glutamic acid, aspartic acid, and GABA was measured to study nitrogen metabolism. Soon after recovery (6-10 hours after recovery) the content of the above compounds in brain tissues increased, except for GABA whose content decreased. Similar but more marked changes were seen in the brain of control rats exposed to a repeated immobilization stress-effect. These changes were still greater in the flight rats exposed to a repeated immobilization stress-effect postflight. It is suggested that the postflight changes of the above parameters of nitrogen metabolism are induced by stress-agents inherent in space flight and recovery. Author

N82-28968# Joint Publications Research Service, Arlington, Va.

MEASUREMENT OF CHARGE AND ENERGY SPECTRA OF HEAVY NUCLEI ABOARD COSMOS-936 ARTIFICIAL EARTH SATELLITE c93

S. A. Dashin, A. M. Marennyy, and G. P. Gertsen *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 107-111 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 70-73 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Charge and energy spectra of heavy charged particles were measured. Measurements were performed by a package of dielectric track detectors mounted behind the shield of 60-80 kg m to the minus second power thick. The charge of nuclei was determined from the complete track length. A group of 1915 tracks of nuclei with $Z > 6$ in the energy range 100-450 MeV/nuclon were identified. The differential charge spectrum of nuclei with $3 < Z < 28$ and the energy spectrum of nuclei of the iron group were built. E.A.K.

N82-28969# Joint Publications Research Service, Arlington, Va.

CONDITION OF RATS CONNECTIVE TISSUE DURING LONG-TERM HYPOKINESIA AND IN RECOVERY PERIOD

P. P. Potapov *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 112-116 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 73-76 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Changes in the content of collagen in hydroxyproline, total aminopolysaccharides hexosamines, and acid glycosaminoglycans in hexuronic acids in the skin and tendons of white rats were determined on the 15, 30 and 19th hypolinetic days and on the 15, 30 and 90th days of posthypokinesia recovery. It was found that the hydroxyproline content in the skin and tendons did not change, the content of hexosamines and hexuronic acid decreased in tendons on hypokinetic days 15 and 90 and in the skin on day 15. The content of hexosamines in the skin increased on day 90, the content of hexosamines and hexuronic acids in the skin and tendons increased on recovery day 15 and remained unaltered on day 90. E.A.K.

N82-28970# Joint Publications Research Service, Arlington, Va.

OSTEOPOROSIS IN UNSUPPORTED EXTREMITIES c52

A. I. Volozhin, G. P. Stupakov, A. N. Polyakov, S. M. Remizov, N. N. Pavlova, and I. Ye. Didenko *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 117-125 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 76-82 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Dystrophic changes in bone tissue, classified as osteoporosis, were demonstrated under the influence of spaceflight factors and model experiments where the bearing function of bones was eliminated. The lower part of the right extremities was amputated in dogs thus generating a support free state of the femur. On day 90 after the amputation bone resorption reached a high level and by the end of the year declined. The mature bone microstructures showed a higher degree of mineralization, whereas the young bone microstructures which were in predominance in the support free femur displayed a lower degree of mineralization. In bone, the content of Ca decreased, that of K increased, while the content of Na and P remained unchanged. It is concluded that the development of osteoporosis in the support free femur does not involve only quantitative variations in the mineral components. E.A.K.

N82-28971# Joint Publications Research Service, Arlington, Va.

PREPARATION OF LABYRINTHECTOMIED ANIMALS FOR FLIGHT ABOARD COSMOS-936 BIOSATELLITE

A. R. Kotovskaya, Ye. A. Savina, A. V. Mokrousova, Ye. I. Alekseuev, A. S. Markin, V. F. Anichin, A. A. Shipov, and G. S. Ayzikov *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 126-131 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 83-86 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Labyrinthectomized animals (LA) were tested aboard the Cosmos 936 biosatellite. It was assumed that examination of LA after the space flight would make it possible to assess the role of the vestibular system in the complex reactions to long term weightlessness. It is found that LA endure weightlessness more calmly and easily than anticipated. Preparation of LA for the space flight included problems like refining of the technique and performing effective labyrinthectomy on animals, monitor their condition in the postoperative period. E.A.K.

N82-28972# Joint Publications Research Service, Arlington, Va.

METHODOLOGICAL ASPECTS OF TESTING ERYTHROCYTE BALANCE BY COUNTING INCUBATED RETICULOCYTES c52

A. V. Llykhin, T. Ye. Burkovakaya, A. V. Shafirkin, and N. V. Klyuchanskaya *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 132-136 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 86-88 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

The mechanisms, causing erythrocyte deficiency are discussed. The correlations between cytokinetic parameters of erythrocyte balance was investigated to assess functional activity, reserve potential and mechanisms of development of various disturbances in the erythron system. Quantitative evaluation of erythrocyte balance are made by cytokinetic methods for examining erythropoiesis and dieresis. Techniques involving intravital labeling of erythrocytes with radioactive isotopes are reliable but not indifferent to the body. It is found that determination of erythrocyte life span by in vitro maturation rate of reticulocytes is least disturbing to the patient and suitable for space research purposes. E.A.K.

N82-28973# Joint Publications Research Service, Arlington, Va.

MODIFICATION OF METHOD FOR ASSAYING OZONE BY THE DIACETYL DIHYDROLUTIDINE REACTION c54

B. V. Anisimov, G. N. Kuzmenko, and T. I. Golubeva *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 137-139 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 89-90 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Ozone as the main toxic component of the atmosphere in photochemical smog and as a necessary factor for trace concentration to assure a biological quality of the atmosphere of areas with people in need of natural air ventilation was studied. Methods for measuring ozone in pressurized areas are discussed. E.A.K.

N82-28974# Joint Publications Research Service, Arlington, Va.

EFFECTS OF LOW-INTENSITY ELECTROMAGNETIC FIELDS ON HUMAN AND ANIMAL ERYTHROCYTES c52

V. P. Shabayev *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 140-142 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 91-92 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

The balancing of Locke-Ringer solution and human and albino rat blood erythrocyte suspensions (50% hematocrit) prepared with this solution was studied. Changes in oxygen concentration and pH served as parameters characterizing the state of the aqueous medium. Permeability of erythrocyte membranes to water according to hemolysis was assessed. A tent which outer wall was made of ferromagnetic material, served as a shield to attenuate the electromagnetic field of Earth. Specimens were exposed for 3 hours in the ungrounded shield and ordinary conditions. The effect of the shield was assessed. The aqueous Locke-Ringer solutions stored under electromagnetic shields contain 8% more oxygen than control. It is found that with the use of the shield there is a large amount of hemoglobin and two other proteins in the intercellular region which are in the space near the cathode in electrophoresis. E.A.K.

N82-28975# Joint Publications Research Service, Arlington, Va.

EFFECT OF HIGH AMBIENT TEMPERATURE ON CARBOHYDRATE METABOLISM IN RAT LIVER AND SKELETAL MUSCLES

R. Akhmedov and A. M. Nasyrova *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 143-146 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 92-94 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Brief and prolonged exposure to high and low ambient temperatures which leads to substantial changes in physiological reactions that maintain temperature homeostasis in organisms was studied. Adaptive changes in physiological functions are based on adaptive shifts in intensity of metabolism and energy. Organic, tissular and cellular mechanisms of change in metabolism, the significant of the different elements of metabolism in different physiological systems of the body involved in maintaining temperature homeostasis with a changing ambient temperature are investigated. Changes in carbohydrate metabolism in the liver and skeletal muscles related to exposure to high ambient temperatures, are demonstrated. E.A.K.

N82-28976# Joint Publications Research Service, Arlington, Va.

VIBRATION AND ASSESSMENT OF THIS FLIGHT FACTOR BY PILOTS c54

Yu. N. Kamenskiy *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 147-151 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 94-96 (For primary document see N82-28949 19-51)

Avail: NTIS HC A08

Vibration on active factors in the pilot-helicoper encironment system is discussed. The effect of this factor on pilot performance and its source of information on the status of the helicoper and its systems is emphasized. The role of noninstrument information (angular and longitudinal accelerations, vibration, noise) in piloting an aircraft (higher precision of control, recognition of emergency situations) is confirmed. Special purpose pilot training in the use of such negative flight factors as vibration, buffeting as information about the status of the vehicle to be controlled is recommended standardized and their practical use are considered. E.A.K.

N82-28977# Joint Publications Research Service, Arlington, Va.

USSR REPORT. LIFE SCIENCES BIOMEDICAL AND BEHAVIORAL SCIENCES, NO. 16

12 May 1982 87 p refs Transl. into ENGLISH of various Russian articles

(JPRS-80789) Copyright. Avail: NTIS HC A05

The use of microorganisms to monitor environmental pollution, the biochemistry of peptide and protein bioregulators, insect breeding, rat behavior, a microelectronic electrode brain probe, and the environmental and genetic aspects of human intellectual capacities are discussed. For individual titles, see N82-28978 through N82-28983.

N82-28978# Joint Publications Research Service, Arlington, Va.

MICROORGANISMS USED TO MONITOR ENVIRONMENTAL POLLUTION

G. A. Bagdasaryan and K. V. Geniatulin *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 16 (JPRS-80789) 12 May 1982 p 1-4 refs Transl. into ENGLISH from Gig. Sanit. (USSR), no. 11, Nov. 1981 p 11-13 (For primary document see N82-28977 19-51)

Copyright. Avail: NTIS HC A05

The use of microorganisms to measure environmental pollution is discussed. Criteria for the selection of specific microorganisms depend on metabolic and genetic changes of the microorganism under the influence of pollution. Development of standardization and metrology of measurements with the required reproducibility and accuracy is considered. Mathematical methods for choosing test systems for microorganisms and their parameters for demonstration of pollutants and processing measurement results are discussed. J.D.

N82-28979# Joint Publications Research Service, Arlington, Va.

MONOGRAPH ON NEW DIRECTION OF CHEMISTRY AND BIOLOGY OF PEPTIDE AND PROTEIN BIOREGULATORS REVIEWED

V. Ivanov and A. Miroshnikov *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 16 (JPRS-80789) 12 May 1982 p 13-15 Transl. into ENGLISH from Izv. Akad. Nauk Latviyskoy SSSR (USSR), no. 1, Jan. 1982 p 137-138 (For primary document see N82-28977 19-51)

Copyright. Avail: NTIS HC A05

The development of methodological and experimental approaches to the study of the mechanisms of action of low molecular peptide hormones and kinins is described. Principles of information theory were applied to studies of complex stochastic systems, and the modeling method was used with extrapolation of results from one complex system to another. The principles that determine ligand-receptor interaction in the formation of complexes of trypsin group enzymes with certain protease inhibitors are analyzed. Common, universal principles which determine peptide-protein and protein-protein interaction are outlined. The selective design and laboratory synthesis of cyclic analogs of hormones and other peptide-protein bioregulators which are more selective and have longer action than their natural prototypes are described. J.D.

N82-28980# Joint Publications Research Service, Arlington, Va.

CULTIVATION OF INSECTS AS NEW BRANCH OF ENTOMOLOGY - INDUSTRIAL ENTOMOLOGY

N. A. Tamarina *In its* USSR Rept.: Life Sci. Biomed. and

Behavioral Sci., No. 16 (JPRS-80789) 12 May 1982 p 16-26 refs Transl. into ENGLISH from Zool. Zh. (USSR), v. 60, no. 11, Nov. 1981 p 1605-1613 (For primary document see N82-28977 19-51)
Copyright. Avail: NTIS HC A05

The general principles and methods of cultivating insects are formulated as a new branch of applied entomology (technical entomology) whose methodology is the systems approach and optimization theory based on modern computer technology. Cultivation of insects is viewed as the development of artificial populations with specified properties. The process of creating cultures is divided into three periods: (1) the introduction of species into the laboratory; (2) the development and standardization of cultures of different types; and (3) the creation of mass scale cultures with specified properties. The tasks and methods of each period are discussed. A new classification is offered for insect cultures. J.D.

N82-28981# Joint Publications Research Service, Arlington, Va.
ORIENTING AND EXPLORATORY BEHAVIOR OF GRAY RAT IN OPEN FIELD. ZOOPSYCHOLOGICAL ANALYSIS
N. N. Meshkova *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 16 (JPRS-80789) 12 May 1982 p 32-41 refs Transl. into ENGLISH from Byull. Mosk. Obshch. Ispyt. Prir., Otd. Biol. (USSR), v. 86, no. 6, Nov. - Dec. 1981 p 22-29 (For primary document see N82-28977 19-51)
Copyright. Avail: NTIS HC A05

The orienting and exploratory behavior of gray rats in an open field environment was observed to contain the following behavior elements: spatial orienting stances, movement, inspection of objects, and actions referable to the category of shifted activity. Each of these elements is readily distinguished in the continuum of behavior and serves a specific role in the familiarization of animals with a new terrain. The process of becoming familiar with an open field is broken down into four stages characterizing different degrees of conformity of rate behavior to the distinctions of the terrain. The animal begins to orient itself with regard to the properties of the field on the basis of its individual experience at the start of the first stage, and a complete image of the surroundings is formed at the fourth stage of exploration. J.D.

N82-28982# Joint Publications Research Service, Arlington, Va.
MICROELECTRONIC ELECTRODE PROBE FOR TESTING BRAIN ELECTRICAL ACTIVITY **c52**
B. V. Zhuravlev and A. B. Simakov *In its* USSR Rept.: Life Sci. Biomed. and Behavior Sci., No. 16 (JPRS-80789) 12 May 1982 p 50-52 refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Radioelektron. (USSR), v. 24, no. 12, Dec. 1981 p 66-68 (For primary document see N82-28977 19-51)
Copyright. Avail: NTIS HC A05

The development and construction of a multichannel electrode probe combining both the micropipette and metal electrodes is described. The size of he active electrode surfaces is 50x50 microns and that of the contact areas is 250x250 microns. Gold is used as the material for the active electrode area. The electrical properties of the probe are described and its main electrical parameters given. The experimental introduction of the probe into the hypothalamus of a rabbit is described. J.D.

N82-28983# Joint Publications Research Service, Arlington, Va.
NATURAL AND SOCIAL DETERMINATION OF HUMAN PSYCHE **c53**
G. I. Tsaregorodtsev and N. I. Gubanov *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 16 (JPRS-80789) 12 May 1982 p 72-82 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 4, Apr. 1981 p 56-65 (For primary document see N82-28977 19-51)
Copyright. Avail: NTIS HC A05

The role of biological and social factors in the inception and development of human consciousness and thinking are discussed in the light of Marxist philosophy. The development of opinions on the relative weight which is given to genetic and social factors in the development of intelligence is focussed upon. It is concluded that intelligence is determined by social factors acting upon inherited mental capacity. J.D.

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N82-28984* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 232)
May 1982 137 p
(NASA-SP-7011(232); NAS 1.21:7011(232)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 437 reports, articles, and other documents introduced into the NASA scientific and technical information system in April 1982. Author

N82-28985* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 233, JUNE 1982
Jun. 1982 115 p
(NASA-SP-7011(233); NAS 1.21:7011(233)) Avail: NTIS HC $7.00 CSCL 06E

This bibliograhy lists 387 reports, articles, and other documents introduced into the NASA scientific and technical information system in May 1982. Author

N82-28986*# Maryland Univ., Baltimore. Dept. of Neurology.
TESTOSTERONE ENHANCES [C-14] 2-DEOXYGLUCOSE UPTAKE BY STRIATED MUSCLE
James Toop and Stephen R. Max [1982] 22 p refs
(Grants NAG2-100; NS-15766)
(NASA-CR-169101; NAS 1.26:169101) Avail: NTIS HC A02/MF A01 CSCL 06P

The effect of testosterone propionate (TP) on C-14 2-deoxyglucose (C-14 2DG) uptake was studied in the rat levator ani muscle in vivo using the autoradiographic technique. Following a delay of 1 to 3 h after injecting TP, the rate of C-14 2DG uptake in experimental animals began to increase and continued to increase for at least 20 h. The label, which corresponds to C-14 2-deoxyglucose 6-phosphate, as demonstrated by chromatographic analysis of muscle extracts, was uniformly distributed over the entire muscle and was predominantly in muscle fibers, although nonmuscular elements were also labeled. The 1 to 3 h time lag suggests that the TP effect may be genomic, acting via androgen receptors, rather than directly on muscle membranes. Acceleration of glucose uptake may be an important early event in the anabolic response of the rat levator ani muscle to androgens. S.L.

N82-28987# Naval Aerospace Medical Inst., Pensacola, Fla.
A PROCEDURE FOR THE ANALYSIS OF NYSTAGMUS AND OTHER EYE MOVEMENTS
Graham R. Barnes 23 Jun. 1981 21 p refs Prepared in cooperation with the Royal Air Force Inst. of Aviation Medicine
(M0933PN004; MR0410103)
(AD-A112603; NAMRL-1280) Avail: NTIS HC A02/MF A01 CSCL 06/16

A new procedure was developed to analyze oculomotor responses to many forms of vestibular and/or visual stimuli used in experimental work and in clinical practice. The main advantage of the procedure lies in the simplicity of the basic algorithm which enables fairly rapid data analysis of a variety of response forms on a medium-speed computer working in a high-level language. For slow phase analysis, detection of saccades is carried out by a simple threshold procedure based upon the expected response form, and regression procedures are used to obtain stimulus-response correlation and slope (gain) measures. The procedure provides measures of gain, phase, and directional preponderance for responses to sinusoidal stimuli. Author (GRA)

N82-28988# Canyon Research Group, Inc., Westlake Village, Calif.
VISUAL TECHNOLOGY RESEARCH SIMULATOR (VTRS) HUMAN PERFORMANCE RESEARCH: PHASE 3 Final

Report, 1 May 1980 - 30 Nov. 1981
G. Lintern, B. E. Nelson, D. J. Sheppard, D. P. Westra, and R. S. Kennedy Nov. 1981 45 p refs
(Contract N61339-78-C-0060)
(AD-A112475; TR-81-022; NAVTRAEQUIPC-78-C-0060-11) Avail: NTIS HC A03/MF A01 CSCL 05/9

This report summarizes the research projects for which Canyon Research Group, Inc. has a major responsibility under the Visual Technology Research Simulator (VTRS) Human Performance Research Contract. The basic research approach has been multifactor and much of the experimental preparations involved demonstration of the feasibility of efficient multifactor designs. Multifactor performance and transfer studies have been completed. Other work has involved the investigation of unconventional visual displays for flight training, automatic freeze techniques for carrier landing instruction, and descent rate cuing as an aid to glideslope tracking for carrier landings. Work has also continued on the development of performance measurement and statistical analysis capabilities. Common emphases of the experimental program were that disparate and generally costly equipment features were studied experimentally in pilots making carrier landings. The general findings were that: practice effects were small; main effects of equipment features modest; some display principles improve performance; and individual differences were reliable and large. The importance of fidelity for other purposes (e.g., pilot acceptance, realism) is problematic. GRA

N82-28989# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
SIMULATION OF THE MOTION OF THE CENTER OF MASS OF AN OCCUPANT UNDER EJECTION ACCELERATIONS Final Report
Louis A. DAulerio and George D. Frisch (Naval Biodynamics Lab., New Orleans) Sep. 1981 46 p refs
(WF4140000)
(AD-A113806; NADC-81305-60) Avail: NTIS HC A03/MF A01 CSCL 06/19

The development of highly sophisticated and complex ejection seats to provide safe egress from aircraft during low altitude, high speed and adverse attitude ejections addresses the need for a reliable computer simulation capability to determine the trajectory of the seat and occupant under these conditions. The occupant response to increasingly severe acceleration profiles must, therefore, be addressed if the simulation model is to be able to evaluate the behavior of the seat/occupant system. Traditionally, the seat and occupant have been treated in combination as a rigid body for purposes of trajectory analysis. However, experience with ejection seat tests has demonstrated a considerable amount of relative motion between the occupant (typically an anthropomorphic dummy) and the seat itself. This report presents a lumped mass, spring-damper mathematical computer model to simulate the motion of the occupant's C.G. with respect to the seat under a dynamic ejection environment. The analysis of anthropomorphic dummy results and of computer generated biodynamic simulation data used in the evaluation of the model will be discussed. Author (GRA)

N82-28990# Lovelace Biomedical and Environmental Research Inst., Albuquerque, N. Mex.
THE BIOLOGICAL EFFECTS OF REPEATED BLASTS Final Report, 30 Apr. 1980 - 30 Apr. 1981
Donald R. Richmond, John T. Yelverton, and E. Royce Fletcher 30 Apr. 1981 42 p refs
(Contract DNA IACRO 81-832; DNA Proj. U99-QAXMK000)
(AD-A113113; AD-E300951) Avail: NTIS HC A03/MF A01 CSCL 06/21

The results of investigations on the biological effects of repeated blasts were reviewed. Sheep and swine were subjected to mulitple blasts at a rate of one per minute in 100-percent mortality in 1 hour. Blast injuries to the organs in the neck (larynx, pharynx, and trachea) and the gastrointestinal tract occurred at blast overpressure levels lower than those necessary for lung hemorrhage for both single and multiple exposures. Curves estimating the LD1 for man as a function of incident overpressure and number of blasts were compiled. For a standing man the LD1 incident overpressure was 27 psi (186 KPa) for a single blast and 18 psi (124 kPa) for five blasts. The overpressures from one or five blasts required to inflict selected injuries in man were presented. Author

N82-28991# Arkansas Univ., Little Rock.
PHYSIOLOGICAL STUDIES OF HEAT STRESS ACCLIMATION DURING A SPECIFIC EXERCISE REGIMEN Final Report
Leland F. Morgans 20 Oct. 1981 7 p Submitted for publication
(Grant AF-AFOSR-0098-81; AF Proj. 2312)
(AD-A111897; AFOSR-82-0091TR) Avail: NTIS HC A02/MF A01 CSCL 06/19

Eleven subjects were used to determine the effects of racquetball on core temperature, skin temperature, sweat production, and weight loss. The results indicated that an hour of racquetball play produced a significant increase in core temperature, a significant decrease in skin temperature, a high level of sweating and a weight loss. It was concluded that the exercise regimen of racquetball can act as a good heat stress acclimator by virtue of finding that it produced a significantly high level of hyperthermia. Author (GRA)

N82-28992# Naval Aerospace Medical Research Lab., Pensacola, Fla.
DETERMINING VISUAL ACUITY THRESHOLDS: A SIMULATION STUDY OF STIMULUS PRESENTATION STRATEGIES
David J. Blower Aug. 1981 24 p refs
(ZF51524004)
(AD-A111821; NAMRL-1282) Avail: NTIS HC A02/MF A01 CSCL 05/10

An accurate and economical method for determining visual acuity thresholds was necessary for many tests in the Vision Test Battery (VTB). There were certain unanswered questions as to how the classical up and down method of presenting stimuli would perform in this regard with a four alternative forced choice task. To answer these questions computer simulation runs of the up and down method were carried out. A model of the psychometric function relating probability of correct detection to stimulus gap size was based on the cumulative normal distribution. The parameters of this model were chosen to characterize one of the acuity tests in the VTB. The intent of the simulation with this model was to generate a large sample of acuity thresholds, and, from this sample, form an estimate of the average acuity threshold and its variability for any given number of trials. An alternative method of presenting stimuli in a sequential manner was also studied via simulation. This method, called the bracket method, proved to be superior to the up and down method in calculating an average estimate of threshold acuity. The error attached to the threshold acuity estimate was also smaller in the bracket method. When the slope of the psychometric curve was varied over a large range, the bracket method retained these advantages over the up and down method. Author (GRA)

N82-28993# Army Research Inst. of Environmental Medicine, Natick, Mass.
ACCLIMATIZATION TO DRY HEAT: ACTIVE MEN VERSUS ACTIVE WOMEN
Donald H. Horstman and Elaine Christensen 29 Jan. 1982 29 p refs
(DA Proj. 3E1-61102-BS-10)
(AD-A111708; USARIEM-M-13/82) Avail: NTIS HC A03/MF A01 CSCL 06/19

The purposes of this study were to compare performance of exercise of equal relative intensity in dry heat and related physiological responses between active men and active women of nearly equal physical fitness level before, during and after heat acclimatization. GRA

N82-28994# Air Force Hospital, Wiesbaden (West Germany). Bioenvironmental Engineering Services Dept.
AN INDUSTRIAL HYGIENE EVALUATION OF AIRCRAFT REFUELING INSIDE CLOSED AIRCRAFT SHELTERS AT ELEVATED AMBIENT TEMPERATURES Final Report, Aug. - Sep. 1981
Joseph A. Martone Oct. 1981 26 p refs
(AD-A114396; BEES(W)-81-42) Avail: NTIS HC A03/MF A01 CSCL 01/3

This report presents results of three in-shelter aircraft refueling tests with ambient temperatures of 30 C or higher. For the specific situations studied, refuel crew personnel were exposed to total fuel vapor concentrations approaching permissible exposure limits. Exposure to benzene and other selected fuel vapor components were well below permissible exposure limits. The data were normalized to predict that personnel exposures above 50 percent of the short term exposure limit for fuel vapors would occur in both first and modified first generation shelters at elevated temperatures. The data support temperature limitations for in-shelter refueling with JP-4 in first and modified first generation shelters. No such limitations were found necessary for second or third generation shelters as they provide nearly three times the dilution volume of first generation shelters. To permit in-shelter refueling above the recommended temperature limits, restrictions on the amount of fuel transferred are suggested. Special consideration is given to the F-111 aircraft because of its large fuel capacity. GRA

N82-28995# Oak Ridge National Lab., Tenn.
WHAT IS ALARA
J. A. Auxier 1981 12 p refs Presented at Edison Elec. Inst. Health Phys. Comm. Meeting, Hartford, 10 Sep. 1981
(DE81-030814; CONF-810968-1) Avail: NTIS HC A02/MF A01

The history of ALARA and what it seemingly means to different interest groups is discussed. A balanced viewpoint that health physicists should adopt is presented. The as-low-as-reasonably-achievable (ALARA) philosophy as it applies to personnel radiation exposure is outlined. The essential tenets of this philosophy surfaced early in the history of the Manhattan Project. Although the terminology has suffered through various translations, the principles remain valid. Some regulatory agencies claim ALARA as their newfound miracle drug and that application according to their prescriptions will result in endless rounds of cyclical improvement in radiation protection practices. Advantage is taken of the popularity of ALARA and the philosophy is standardized to mean whatever is expedient for their purposes.

N82-28996# Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
THE CONSEQUENCES OF HYDRAZINE EXPOSITION AND ITS TREATMENT
E. Meeter Jun. 1981 11 p refs In DUTCH; ENGLISH summary
(Contract A76/K/098)
(MBL-1981-2; TDCK-75105) Avail: NTIS HC A02/MF A01

The consequences for man and animals of exposure to hydrazine in the event of a crash of an F-16 aircraft whose emergency power unit contains hydrazine are described. Hydrazine and its derivatives are corrosive to eyes, mucous membranes and skin, and are harmful to many organs. The measures to be taken in case of an accident are outlined. Author (ESA)

N82-28950# Joint Publications Research Service, Arlington, Va.
PROBLEM OF ACCELERATIONS IN AVIATION MEDICINE
P. V. Vasilyev and S. A. Gozulov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 2 Jul. 1982 p 1-6 (JPRS 81197) refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 4-7 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28951# Joint Publications Research Service, Arlington, Va.
SLEEP, CIRCADIAN CYCLES OF PHYSIOLOGICAL FUNCTIONS AND PARAMETERS OF HUMAN WORK CAPACITY ON FIRST DAY AFTER CHANGING FROM ALTERED TO USUAL SLEEP-WAKING CYCLE
A. N. Litsov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 7-14 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 8-13 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28952# Joint Publications Research Service, Arlington, Va.
ROLE OF HORMONAL COMPOUNDS IN REGULATION OF ELECTROLYTE METABOLISM IN THE PRESENCE OF EMOTIONAL STRESS
B. B. Afonin, L. L. Orlov, N. F. Kalita, T. A. Viting, and R. A. Tigranyan *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 15-19 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 13-16 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28954# Joint Publications Research Service, Arlington, Va.
DYNAMICS OF LEFT VENTRICULAR SYSTOLIC PHASE STRUCTURE DURING LONG-TERM (140-185 DAYS) SPACEFLIGHTS
A. P. Polyakova, A. D. Yegorov, and I. V. Alferova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 32-38 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 25-30 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28955# Joint Publications Research Service, Arlington, Va.
SLOW WAVES OF CARDIAC RHYTHM IN HEALTHY MAN UNDER DIFFERENT CONDITIONS
A. N. Karpov and L. A. Zinovyeva *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-8197) 2 Jul. 1982 p 39-42 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 30-32 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28956# Joint Publications Research Service, Arlington, Va.
SYNCHRONIZATION OF CARDIOVASCULAR ACCIDENTS WITH PHYSICAL CLOCKS
R. M. Arslanova, V. N. Benevolenskiy, N. G. Ptitsyna, and K. A. Trukhanov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 43-47 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 32-34 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28957# Joint Publications Research Service, Arlington, Va.
REGULATION OF CEREBRAL CIRCULATION IN ERECT POSITION
V. S. Shubin, V. L. Anzimirov, Ya. K. Gasanov, and V. N. Korniyenko *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 48-55 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 35-40 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28958# Joint Publications Research Service, Arlington, Va.
ENDURANCE OF +Gz G FORCES BY MIDDLE-AGED PEOPLE BEFORE AND AFTER 7-DAY IMMERSION
A. R. Kotovskaya, I. F. VilVilyams, V. I. Zborovskaya, V. G. Andreyeva, O. L. Golovkina, T. N. Krupina, Kh. Kh. Yarullin, and N. P. Artamonova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 56-60 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 40-43 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28959# Joint Publications Research Service, Arlington, Va.
HUMAN EXTERNAL RESPIRATION AND GAS EXCHANGE

IN ACUTE PERIOD OF ADAPTATION TO IMMERSION IN WATER
O. L. Golovkina *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1082 (JPRS 81197) 2 Jul. 1982 p 61-65 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 43-46 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28960# Joint Publications Research Service, Arlington, Va.
REACTION TO DIMINISHED CIRCULATING BLOOD VOLUME IN INDIVIDUALS WHO ARE SUSCEPTIBLE AND INSUSCEPTIBLE TO MOTION SICKNESS (SEASICKNESS)
V. G. Isupov, D. G. Maksimov, and B. I. Polyakov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 66-70 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 46-49 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28961# Joint Publications Research Service, Arlington, Va.
EFFICACY OF KAVINTON IN PREVENTION OF MOTION SICKNESS
D. Bodo, A. R. Kotovskaya, R. R. Galle, L. N. Gavrilova, G. A. Gusakova, and V. A. Smirnov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 71-74 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 49-51 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28962# Joint Publications Research Service, Arlington, Va.
NYSTAGMOMETRY OF OPTOVESTIBULAR INTERACTION
M. M. Levashov and A. I. Tumakov *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 75-80 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 51-55 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28963# Joint Publications Research Service, Arlington, Va.
EFFECT OF CALORIC STIMULATION OF VESTIBULAR SYSTEM ON HEARING
G. P. Tsurikova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 81-86 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 55-58 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28964# Joint Publications Research Service, Arlington, Va.
POSSIBLE IMPAIRMENT OF RESPIRATORY REGULATION UNDER HYPERBARIC NITROGEN NARCOSIS
L. A. Bryantseva, A. V. Suvorov, and I. S. Breslav *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 87-90 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 59-61 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28970# Joint Publications Research Service, Arlington, Va.
OSTEOPOROSIS IN UNSUPPORTED EXTREMITIES
A. I. Volozhin, G. P. Stupakov, A. N. Polyakov, S. M. Remizov, N. N. Pavlova, and I. Ye. Didenko *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 117-125 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 76-82 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28972# Joint Publications Research Service, Arlington, Va.
METHODOLOGICAL ASPECTS OF TESTING ERYTHROCYTE BALANCE BY COUNTING INCUBATED RETICULOCYTES
A. V. Llykhin, T. Ye. Burkovakaya, A. V. Shafirkin, and N. V. Klyuchanskaya *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 132-136 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 86-88 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28974# Joint Publications Research Service, Arlington, Va.
EFFECTS OF LOW-INTENSITY ELECTROMAGNETIC FIELDS ON HUMAN AND ANIMAL ERYTHROCYTES
V. P. Shabayev *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 140-142 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 91-92 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28982# Joint Publications Research Service, Arlington, Va.
MICROELECTRONIC ELECTRODE PROBE FOR TESTING BRAIN ELECTRICAL ACTIVITY
B. V. Zhuravlev and A. B. Simakov *In its* USSR Rept.: Life Sci. Biomed. and Behavior Sci., No. 16 (JPRS-80785) 12 May 1982 p 50-52 refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Radioelektron. (USSR), v. 24, no. 12, Dec. 1981 p 66-68 (For primary document see N82-28977 19-51)
Copyright. Avail: NTIS HC A05

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N82-28997# Pennsylvania State Univ., University Park. Dept. of Psychology.
ADAPATIVE MOTIVATION THEORY Annual Report, 15 Dec. 1979 - 1 Feb. 1981
Frank J. Landy Feb. 1982 60 p refs
(Contract N00014-81-K-0197; NR Proj. 170-906)
(AD-A111195; Rept-82-1) Avail: NTIS HC A04/MF A01 CSCL 05/10

This report presents the theoretical foundation for a new set of propositions regarding human motivation called Adaptive Motivation Theory. The major proposition of the theory is that individuals undergo cognitive change as a result of environmental interaction. This cognitive change has implications for motivated behavior. In addition to a statement of the theory, activities for the past year and the next year are discussed. Author (GRA)

N82-28998# Navy Personnel Research and Development Center, San Diego, Calif.
ON MODELS AND METHODS FOR PERFORMANCE MEASUREMENT Final Report, Aug. 1979 - Sep. 1980
William J. Moonan Mar. 1982 22 p refs
(AD-A113578; NPRDC-TN-82-11; NPRDC-11-80-12) Avail: NTIS HC A02/MF A01 CSCL 05/9

Models were specified and methods defined that characterize performance measurement as a process and as a function of (1) the performer's capability, (2) variables that indicate how well job operations are performed, and (3) the difficulties of those operations. The report shows methods of mathematical measurement model development that relate (1), (2), and (3) above. A performance quality model was defined. Illustrations of two performance models were provided through examples.
Author (GRA)

N82-28999# Canyon Research Group, Inc., Westlake Village, Calif.
UNCONVENTIONAL VISUAL DISPLAYS FOR FLIGHT TRAINING Interim Technical Report, 1 May 1980 - 30 Nov. 1981
Robert T. Hennessy (NAS-NRC), Gavan Lintern, and Stanley C. Collyer (Naval Training Equipment Center) Orlando, Fla. Naval Training Equipment Center Nov. 1981 66 p refs
(Contract N61339-78-C-014)
(AD-A111392; TR-81-014; NAVTRAEQUIPC-TR-81-014) Avail: NTIS HC A04/MF A01 CSCL 05/9

Use of simulators for flight instruction has typically followed the pattern of using similar instructional approaches to those that have traditionally been used for in-flight instruction. However, there is a growing awareness that a simulator permits radical departures from the traditional methods. Some of these may be less expensive or even more effective in terms of acquiring the skill. The general purpose of the research reported here was to examine training effectiveness for basic flight tasks of radically different methods of displaying the information that is necessary to support learning of the tasks. Four different visual displays were evaluated for their effectiveness in the acquisition of flight tasks in a simulator. The control condition had a wide field-of-view, a horizon and a checkerboard ground plane that obeyed laws of motion and perspective. The experimental displays were: (1) a narrow field-of-view with horizon and checkerboard ground plane; (2) an outside viewpoint of an aircraft; and (3) a display that consisted only of normal flight instruments. Flight-naive subjects were taught to fly straight-and-level for twenty trials with either the control or one of the experimental displays and then tested for twenty trials on the control display. Training, transfer, and differential transfer performance was examined. GRA

N82-29000# Naval Biodynamics Lab., New Orleans, La.
TASK ANALYSIS AND THE ABILITY REQUIREMENTS OF TASKS: COLLECTED PAPERS
R. H. Shannon and Robert C. Carter Sep. 1981 27 p refs
(AD-A111181; NBDL-81R009) Avail: NTIS HC A03/MF A01 CSCL 05/9

This is a collection of papers on the topic of using task analysis to identify the abilities required for jobs. Identification of ability requirements is a first step in the process of assembling performance tests that are related to a particular job. Once assembled such tests could be used for many purposes. One use would be selection of personnel who are especially gifted with the required attributes. The use to which the authors' efforts are directed is environmental research. Environmental research is the study of human performance in unusual environments (e.g., vibration, ship motion, impact) in order to determine whether and to what degree the environment affects performance. Such research is more relevant to the Navy when the human performance studied is related to Navy jobs. Author (GRA)

N82-29001# Forschungsinstitut fuer Anthropotechnik, Bonn (West Germany).
THE RANKING OF DISPLAYS BASED ON TRANSINFORMATION [DIE BEWERTUNG VON ANZEIGEN DURCH DEN TRANSINFORMATIONSFLUSS]
K.R. Kimmel Nov. 1981 86 p refs In GERMAN; ENGLISH summary
(FB-52) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10

Transinformation as a means to discriminate between alternative display configuration with a compensatory control task was investigated. Root-mean-square (rms) control error was used for comparison purposes. The dynamics of the controlled elements and the bandwidths of the stochastic disturbance functions served as independent parameters in the experiment. Results from both measures, in general, show good agreement, being somewhat more consistent with transinformation, the superiority of which can clearly be seen when an additional auditory of visual discrete supervisory task is added. Control rms did not permit the construction of a unitary total performance measure in multiple task situations. Transinformation, on the other hand, confirmed the rankings of the different display configurations which were obtained for the pure analog compensatory manual control task. Author (ESA)

N82-28983# Joint Publications Research Service, Arlington, Va.
NATURAL AND SOCIAL DETERMINATION OF HUMAN PSYCHE
G. I. Tsaregorodtsev and N. I. Gubanov *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci., No. 16 (JPRS-80789) 12 May 1982 p 72-82 refs Transl. into ENGLISH from Vestn. Akad. Med. Nauk SSSR (USSR), no. 4, Apr. 1981 p 56-65
(For primary document see N82-28977 19-51)
Copyright. Avail: NTIS HC A05

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N82-29002* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THERMAL GARMENT Patent
James H. Hopper, inventor (to NASA) (United Aircraft Corp., East Hartford, Conn.) Issued 3 Jan. 1967 6 p Filed 3 Sep. 1964 Sponsored by NASA
(NASA-Case-XMS-03694-1; US-Patent-3,295,594; US-Patent-Appl-SN-394280; US-Patent-Class-165-46) Avail: US Patent and Trademark Office CSCL 06K

An anthropomorphic thermal garment made entirely of fluid-carrying tubing, joined in such a way that the tubes form a network or mesh fabric, is described. N.W.

N82-29003*# Massachusetts Inst. of Tech., Cambridge. Dept. of Nutrition and Food Science.
EVALUATION OF ENGINEERING FOODS FOR CLOSED ECOLOGICAL LIFE SUPPORT SYSTEM (CELSS) Final Report, 1 Feb. 1980 - 1 Mar. 1982
Marcus Karel 1 Mar. 1982 162 p refs
(Contract NAS9-16008)
(NASA-CR-167626; NAS 1.26:167626) Avail: NTIS HC A08/MF A01 CSCL 06K

A nutritionally adequate and acceptable diet was evaluated and developed. A design for a multipurpose food plant is discussed. The types and amounts of foods needed to be regenerated in a partially closed ecological life support system (PCELSS) were proposed. All steps of food processes to be utilized in the multipurpose food plant of PCELSS were also considered. Equipment specifications, simplification of the proposed processes, and food waste treatment were analyzed. N.W.

N82-29004*# Little (Arthur D.), Inc., Cambridge, Mass.
NUTRITION AND FOOD TECHNOLOGY FOR A CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEM (CELSS)
Peter E. Glaser and Judith A. Mabel May 1981 96 p refs
(Contract NAS9-15652)
(NASA-CR-167392; NAS 1.26:167392) Avail: NTIS HC A05/MF A01 CSCL 06K

Food technology requirements and a nutritional strategy for a Controlled Ecological Life Support System (CELSS) to provide adequate food in an acceptable form in future space missions are discussed. The establishment of nutritional requirements, dietary goals, and a food service system to deliver acceptable foods in a safe and healthy form and the development of research goals and priorities were the main objectives of the study. M.D.K.

N82-29005*# California Univ., Berkeley. Dept. of Mechanical Engineering.
A DESIGN METHODOLOGY FOR NONLINEAR SYSTEMS CONTAINING PARAMETER UNCERTAINTY: APPLICATION TO NONLINEAR CONTROLLER DESIGN
Gary Young May 1982 90 p refs
(Contract NCC2-67)
(NASA-CR-166358; NAS 1.26:166358) Avail: NTIS HC A05/MF A01 CSCL 05H

A design methodology capable of dealing with nonlinear systems, such as a controlled ecological life support system

(CELSS), containing parameter uncertainty is discussed. The methodology was applied to the design of discrete time nonlinear controllers. The nonlinear controllers can be used to control either linear or nonlinear systems. Several controller strategies are presented to illustrate the design procedure. E.A.K.

N82-29006*# Massachusetts Inst. of Tech., Cambridge. Dept. of Nutrition and Food Science.

EVALUATION OF ENGINEERING FOODS FOR CONTROLLED ECOLOGICAL LIFE SUPPORT SYSTEMS (CELSS)

Marcus Karel Jun. 1982 92 p refs
(Contract NAS9-16008)
(NASA-CR-166359; NAS 1.26:166359; CELSS-13) Avail: NTIS HC A05/MF A01 CSCL 06K

The feasibility of developing acceptable and reliable engineered foods for use in controlled ecological support systems (CELSS) was evaluated. Food resupply and regeneration are calculated, flow charts of food processes in a multipurpose food pilot plant are presented, and equipment for a multipurpose food pilot plant and potential simplification of processes are discussed. Food-waste treatment and water usage in food processing and preparation are also considered. A.R.H.

N82-29007# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering/Operations Research.

RULE-BASED PROGRAMMING FOR HUMAN-COMPUTER INTERFACE SPECIFICATION

John W. Roach and Glenn S. Fowler Jan. 1982 81 p refs
(Contract N00014-81-K-0143; NR Proj. SR0-101)
(AD-A113036; CSIE-82-5) Avail: NTIS HC A05/MF A01 CSCL 09/2

An implementation of a rule-based language related to PROLOG for the specification of human-computer interfaces is described. It is based not upon von Neumann computer architectures but rather upon Post production systems or Markov algorithms, which are the foundations of computer science.
Author

N82-29008# Naval Submarine Medical Research Lab., Groton, Conn.

COLD WEATHER GOGGLES. 2: PERFORMANCE EVALUATION Interim Report

S. M. Luria 23 Mar. 1982 17 p refs
(M0095PN001)
(AD-A114067; NSMRL-978) Avail: NTIS HC A02/MF A01 CSCL 06/17

The performance of various tasks of importance to the Marines was compared when the subjects were wearing different goggles designed to protect the eyes from the cold. Color perception through yellow goggles and riflery through the most distorted goggles were degraded, but there were no significant impairments in acuity, depth perception, or vision through binoculars. The optical standards adhered to in the manufacture of commercial goggles appears to permit the satisfactory performance of practical tasks. Author (GRA)

N82-29009# Naval Biodynamics Lab., New Orleans, La.

BIOMECHANICAL ANALYSIS OF TASKS INVOLVING MANUAL MATERIALS HANDLING

Richard H. Shannon Feb. 1982 27 p refs
(AD-A113955; NBDL-82R001) Avail: NTIS HC A03/MF A01 CSCL 05/5

Biomechanics and their relationships with manual materials handling, sex differences and training are discussed. A factor analytic model of lifting in the floor knuckle and knuckle shoulder regimens under experimental conditions is considered. Sixteen subjects were divided equally into four groups of males trained/untrained and females trained/untrained. Results indicated that (1) there were different motion patterns among the four groups, (2) male movements approximated the trained and female movements the untrained conditions, and (3) trained individuals demonstrated more efficient and coordinated lifts. Training programs are recommended in the working environment if women are expected to lift moderately heavy loads because of their lower physical fitness and coordination when compared to men. This statement is further supported by the second paper, which conducted a critical incident technique of 484 strain/sprain/overexertion injuries of naval civilian government workers was conducted. Results indicated that males had significantly more injuries to the back, to craftsmen/operatives/laborers, using heavy/very heavy weight. GRA

N82-29010# Purdue Univ., Lafayette, Ind. School of Engineering.

DEVELOPMENT OF A METHODOLOGY FOR ASSESSING AIRCREW WORKLOADS Final Report, Oct. 1978 - Dec. 1980

James R. Buck, James W. Barany, Mark L. Lehto, David M. Ings, David R. Payne, Roy D. Nixon, and William H. Grosse Wright-Patterson AFB, Ohio Aerospace Medical Research Labs. Nov. 1981 95 p refs
(Contract F33615-78-D-0617; AF Proj. 7184)
(AD-A114364; AFAMRL-TR-81-50) Avail: NTIS HC A05/MF A01 CSCL 05/5

The adaptability of industrial methods for setting job and time standards to workload assessment requirements was investigated. Methods considered included direct and indirect time study, synthetic time systems, standard data systems, information content analysis, work sampling and job evaluation. Conventional methods were found to be deficient in accounting for task time variability, divided-attention effects, and cognitive demands which are regarded as critical to effective air crew workload assessment. A combination of synthetic time and standard data system methodologies was proposed as an effective approach to the problem. Three experiments were conducted to evaluate the feasibility of developing a Synthetic Data System(SDS) consistent with workload assessment needs. Swithing, communication and perceptual-mediational tasks were paired with tracking to create divided-attention demands characteristic of pilot workloads. Regression analyses showed that significant amounts of variance in task time requirements and error rates could be accounted for in terms of task and man-machine interface design variables. Development of an SDS on the basis of the performance of aircrew members in aircraft simulators is recommended. GRA

N82-29011# Texas Univ., Austin. Center for Cybernetic Studies.

AIRCRAFT AND CREW SCHEDULING DURING AIRLIFT OPERATIONS

R. D. Armstrong (Georgia Univ.), R. D. Charnes, and S. Samn (School of Aerospace Medicine) Nov. 1981 21 p refs
(Contract N00014-75-C-0569)
(AD-A114114; CCS-402) Avail: NTIS HC A02/MF A01 CSCL 12/2

The Air Force is frequently placed in a situation where a large quantity of goods must be transported between various locations in a specified time period by Air Force personnel. The goods are of different and interrelated types; thus, the sequence of missions is specified to maintain a proper balance of goods at each location. In addition to aircraft maintenance, health and alertness maintenance for pilots and personnel is a vital consideration in scheduling. Nevertheless, economy in operations needs to be demonstrated. Thus, the problem addressed in this paper is one of minimizing the number of crews used in the airlift, subject to crew rest requirements and the completion of all missions within the specified time frame. Author (GRA)

N82-29012# Wright State Univ., Dayton, Ohio. School of Medicine.

FLIGHT CREWMEMBER WORKLOAD EVALUATION Final Report, Aug. 1980 - Apr. 1981

Richard L. Sulzer, William J. Cox, and Stanley R. Mohler Apr. 1981 208 p refs
(Contract F33615-80-K-3627)
(AD-A114167; DOT-FAA-RD-82-21; DOT-FAA-ASF-82-1) Avail: NTIS HC A10/MF A01 CSCL 01/3

This is a report on transport category airplane flight crew workload measurement techniques as used in cockpit development and aircraft certification tests by major U.S. airframe manufacturers. It reviews the fundamentals of: crew size certification; workload measures and criteria; workload studies made during aircraft design; and workload studies made after the design has been established, including those used in flight test. Certain documentation practices are identified. The limitations of the

currently used practices and the needs for improved workload measurement techniques are addressed. Author (GRA)

N82-28953# Joint Publications Research Service, Arlington, Va.
METABOLIC DISTINCTIONS RELATED TO INTAKE OF LOW-CALORIE 'SURVIVAL' RATIONS CONSISTING ONLY OF READILY ASSIMILATED CARBOHYDRATES
I. G. Popov, P. A. Lozinskiy, A. A. Latskevich, and I. A. Romanova *In its* USSR Rept.: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 20-31 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 16-25 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28973# Joint Publications Research Service, Arlington, Va.
MODIFICATION OF METHOD FOR ASSAYING OZONE BY THE DIACETYL DIHYDROLUTIDINE REACTION
B. V. Anisimov, G. N. Kuzmenko, and T. I. Golubeva *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 137-139 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 89-90 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

N82-28976# Joint Publications Research Service, Arlington, Va.
VIBRATION AND ASSESSMENT OF THIS FLIGHT FACTOR BY PILOTS
Yu. N. Kamenskiy *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS-81197) 2 Jul. 1982 p 147-151 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 94-96 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering*.

N82-29013* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
RECONFIGURING REDUNDANCY MANAGEMENT Patent
Hendrik J. C. Gelderloos, inventor (to NASA) (Honeywell, Inc., St. Petersburg, Fla.) Issued 27 Apr. 1982 10 p Filed 30 Jul. 1980 Supersedes N80-30050 (18 - 20, p 2758) (NASA-Case-MSC-18498-1; US-Patent-4,327,437; US-Patent-Appl-SN-173518; US-Patent-Class-371-68; US-Patent-Class-244-194; US-Patent-Class-318-564) Avail: US Patent and Trademark Office CSCL 09B

A redundancy management system is described wherein input signals from a sensor are provided redundantly in parallel so that a primary control signal may be selected. Median value signals for groups of three sensors are detected in median value selectors of selection filter. The detected median value signals are then also compared in a subtractor/comparator to determine whether any of them exceed the others by an amount greater than the signal level for a failed sensor. If so, the exceeding detected medium value signal is sent to a control computer as the primary control signal. If not, the lowest level detected medium value signal is sent as the primary control signal.

Official Gazette of the U.S. Patent and Trademark Office

N82-29014# Stanford Univ., Calif.
VIRTUAL MEMORY MANAGEMENT Ph.D. Thesis
Richard William Carr Sep. 1981 236 p refs
(Contract DE-AC03-76SF-00515)
(SU-SLAC-244; SU-STAN-CS-81-873) Avail: NTIS HC A11/MF A01

Methods of scheduling, memory management, and load control in a virtual memory computer system were studied. The problem of modeling virtual memory systems were also studied. The two alternative classes, local and global, of virtual memory management policies, are compared. A trace-driven model of program behavior that reduces the cost of simulation with a negligible loss of accuracy was developed. A simulation model of multiprogrammed virtual memory systems was constructed.

Author

N82-29015# Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
OPTIMIXING SYNCHRONOUS SYSTEMS
Charles E. Leiserson and John B. Saxe (Carnegie-Mellon Univ.) Mar. 1982 32 p refs
(Contracts N00014-80-C-0622; N00014-76-C-0370)
(AD-A113916; MIT/LCS/TM-215) Avail: NTIS HC A03/MF A01 CSCL 09/2

The complexity of integrated-circuit chips produced today makes it feasible to build inexpensive, special-purpose subsystems that rapidly solve sophisticated problems on behalf of a general-purpose host computer. This paper contributes to the design methodology of efficient VLSI algorithms. We present a transformation that converts synchronous systems into more time-efficient, systolic implementations by removing combinational rippling. The problem of determining the optimized system can be reduced to the graph-theoretic single-destination-shortest-paths problem. More importantly from an engineering standpoint, however, the kinds of rippling that can be removed from a circuit at essentially no cost can be easily characterized. For example, if the only global communication in a system is broadcasting from the host computer, the broadcast can always be replaced by local communication. Author (GRA)

N82-29016# Naval Research Lab., Washington, D. C.
AN INTELLIGENT CONTROL STRATEGY FOR COMPUTER CONSULTATION
J. Slagle and E. Halpern 8 Apr. 1982 79 p refs
(AD-A113388; NRL-MR-4789) Avail: NTIS HC A05/MF A01 CSCL 09/2

The heart of a computerized expert system such as MYCIN or PROSPECTOR, is embodied in an inference network of associated propositions. Inference networks are organized with rules that direct the propagation of information. A top proposition under consideration is updated by depth-first traversal of the entire networks in many current systems. We have applied the concept of 'merit' to consultant systems to direct this network traversal. Merit values force a limited best-first traversal of the inference network, requesting only the most pertinent ifnormation from the user. The notion of merit previously used in the MULTIPLE system has been extended to the MYCIN style of propagation and to the subjective Bayesian updating used in PROSPECTOR. In addition, we propose a general mechanism for merit calculation with any differentiable updating scheme. Merits will provide an

intelligent, efficient mechanism for controlling new, more versatile expert consultant systems. Author (GRA)

N82-29017# European Organization for Nuclear Research, Geneva (Switzerland).
PROCEEDINGS OF THE 1980 CERN SCHOOL OF COMPUTING
12 Mar. 1981 414 p refs Meeting held at Vraona-Attiki, Greece, 14-27 Sep. 1980
(CERN-81-03) Avail: NTIS HC A18/MF A01

Subjects related to computing in high energy physics are addressed. The proceedings contain notes of lectures on methods in numerical approximation, on the statistical significance of experimental data, and on symbolic computation and its application to high energy physics. Two lectures covered data analysis for electronic experiments and for bubble chamber and hybrid experiments, respectively. Aspects of on-line computing and the underlying microprocessor technology were treated in lectures on the use of intelligent devices in high energy physics experiments, on microprogramming and bit-slice technology, and on software tools for microprocessor-based systems. Another lecture covered practical data acquisition problems. These proceedings also contain lecture notes on fault-tolerant computing systems and on technological advancements in computer systems and networks. M.G.

N82-29018# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
RESEARCH PROGRAM IN FULLY DISTRIBUTED PROCESSING SYSTEMS Quarterly Progress Report, 1 Sep. - 30 Nov. 1981
Philip H. Enslow, Jr., Nancy A. Lynch, and Alton P. Jensen Jan. 1982 12 p
(Contracts N00014-79-C-0873; F30602-78-C-00120; F30602-81-C-0249; DAAG29-79-C-0155; DAAK70-79-D-0097; Grant NSF MCS-79-24370)
(AD-A114199; QPR-9) Avail: NTIS HC A02/MF A01 CSCL 09/2

This is the Ninth Quarterly Progress Report prepared covering the Georgia Tech Research Program in Fully Distributed Processing Systems (FDPS). The Georgia Tech Research Program in Fully Distributed Processing Systems is a comprehensive investigation of data processing systems in which both the physical and logical components are extremely loosely coupled while operating with a high degree of control autonomy at the component level. The definition of the specific class of multiple computer systems being investigated, and the operational characteristics and features of those systems is motivated by the desire to advance the state-of-the-art for that class of systems that will deliver a high proportion of the benefits currently being claimed for distributed processing systems. The scope of individual topics being investigated under this program ranges from formal modeling and theoretical studies to empirical examinations of prototype systems and simulation models. Also included within the scope of the program are areas such as the utilization of FDPS's and their interaction with management operations and structure. GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N82-29019 Royal Signals and Radar Establishment, Malvern (England).
ADA ON MULTIPLE PROCESSORS
John A. McDermid 11 Mar. 1982 9 p
(RSRE-Memo-3464; BR83036) Copyright. Avail: Issuing Activity

Ways of implementing the ADA rendezvous in a computer system, comprising a number of processors, are considered. Although in principle a two phase protocol requiring four messages to be passed is necessary to implement the rendezvous correctly when timed calls are used, in many cases a simpler, one phase, protocol requiring only two messages per rendezvous can be used. Rendezvous and message based communication are compared for situations where one to many, rather than one to one, communication is required. The rendezvous is shown to be very inefficient for implementing one to many communication. In multicomputer systems, the main body should consist only of task declaration. No task should create a task to run another machine. Author (ESA)

N82-29020# RAND Corp., Santa Monica, Calif.
FUTURE COMPUTING
David Leinweber Dec. 1981 48 p refs
(RAND/P-6680) Avail: NTIS HC A03/MF A01

The projected development of complexity in microelectronic components, computer systems, and very large scale integration (VLSI) is surveyed. The consequences of the reduction in feature size in integrated circuits and the simultaneous increase in the maximum chip size is demonstrated. The shortage of software and computer programmers is considered. The architecture of a general multiprocessor and its application to electronic countermeasures is discussed. The integration of existing hardware with VLSI emulators to form the basis of a high performance emitter-locator system is demonstrated. The application of conservation laws to computing, leading to a universal and reversible conservative logic element is discussed. J.D.

N82-29021*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FORTRAN STATIC SOURCE CODE ANALYZER (SAP) USER'S GUIDE
Feb. 1978 72 p refs
(Contract NAS5-24300)
(NASA-TM-84786; SEL-78-002; NAS 1.15:84786) Avail: Issuing Activity CSCL 09B

A user's guide for the FORTRAN Static Source Code Analyzer Program is presented. Included herein is a user's guide to the source code scanning and statistical reporting program whose purpose is to assist in Software Engineering studies of FORTRAN programs in use at Goddard Space Flight Center. Author

N82-29022*# Research Triangle Inst., Research Triangle Park, N. C. Systems and Measurements Div.
PROBLEMS RELATED TO THE INTEGRATION OF FAULT TOLERANT AIRCRAFT ELECTRONIC SYSTEMS
J. A. Bannister, V. Adlakha, K. Trivedi, and T. A. Alspaugh, Jr. Jun. 1982 167 p refs
(Contract NAS1-16489)
(NASA-CR-165926; NAS 1.26:165926; RTI/2094/02-02F) Avail: NTIS HC A08/MF A01 CSCL 09B

Problems related to the design of the hardware for an integrated aircraft electronic system are considered. Taxonomies of concurrent systems are reviewed and a new taxonomy is proposed. An informal methodology intended to identify feasible regions of the taxonomic design space is described. Specific tools are recommended for use in the methodology. Based on the methodology, a preliminary strawman integrated fault tolerant aircraft electronic system is proposed. Next, problems related to the programming and control of inegrated aircraft electronic systems are discussed. Issues of system resource management, including the scheduling and allocation of real time periodic tasks in a multiprocessor environment, are treated in detail. The role of software design in integrated fault tolerant aircraft electronic systems is discussed. Conclusions and recommendations for further work are included. M.G.

N82-29023*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SYSTEM DESCRIPTION OF THE IMP-16C MICROPROCESSOR ORBIT DETERMINATION PROGRAM
Oct. 1978 180 p refs
(Contract NAS5-24300)
(NASA-TM-84802; STL-78-001; NAS 1.15:84802) Avail: Issuing Activity CSCL 09B

The ground based IMP orbit determination Program is described. The system is implemented on two interconnected IMP-16C microprocessors. Included are the system requirements and the results of the pre-design studies, as well as the design and implementation of the system. The appendices furnish descriptions of the scratch storage layouts, the valid system

messages, and some architectural features of the IMP-16C microprocessor. M.G.

N82-29024*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LANDSAT/NAVPAK SYSTEM DESCRIPTION AND USER'S GUIDE
Sharon R. Waligora (Computer Sciences Corp.), Rosemarna S. Pajerski, Keiji K. Tasaki, Frank E. McGarry, and Charles E. Goorevich Dec. 1978 370 p refs
(NASA-TM-84782; NAS 1.15:84782; STL-78-002) HC A16/MF A01 CSCL 09B

The LANDSAT Navigation Package (NAVPAK) is discussed. LANDSAT NAVPAK, which is implemented on the Data Acquisition and Flight Dynamics Minicomputer System (PDP 11/70), performs landmark extraction and orbit/attitude estimation, in order to provide automatic registration of landmarks from LANDSAT imagery. A comprehensive description of the mathematical models, logic structure, and modular arrangement of the LANDSAT NAVPAK components are presented. An overview of the LANDSAT NAVPAK system, subroutine descriptions and tree charts are provided. The COMMON blocks and external data sets used by LANDSAT NAVPAK are described. A comprehensive user's guide for LANDSAT NAVPAK is provided. Author

N82-29025*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INTEL 8080 ORBIT PROPAGATION PROGRAM SYSTEM DESCRIPTION AND USER'S GUIDE
Apr. 1979 67 p refs
(Contract NAS5-24300)
(NASA-TM-84783; STL-79-001; NAS 1.15:84783) Avail: Issuing Activity CSCL 09B

A system description and user's guide for the Intel 8080 orbit propagator developed on the Tektronix 8002 microprocessor development system are provided. The Intel 8080 orbit propagator contains a force model up to 6 by 6 and includes the effects of the Sun and Moon. The propagator was specifically designed to handle the class of geosynchronous orbits. Author

N82-29026*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EVALUATION OF THE IMP-16 MICROPROCESSOR ORBIT DETERMINATION SYSTEM FILTER
Charles M. Shenitz (Computer Sciences Corp.) and Keiji K. Tasaki Sep. 1979 31 p refs
(Contract NAS5-24300)
(NASA-TM-84788; NAS 1.15:84788; STL-79-002) Avail: NTIS HC A03/MF A01 CSCL 09B

The results of the numerical tests performed in evaluating the interplanetary monitoring platform-16 orbit determination system are presented. The system is capable of performing orbit determination from satellite to satellite tracking data in applications technology satellite range and range rate format. The estimation scheme used is a Kalman filter, sequential (recursive) estimator. Descriptions of the tests performed and tabulations of the numerical results are included. M.G.

N82-29027*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MULTIMISSION MODULAR SPACECRAFT GROUND SUPPORT SOFTWARE SYSTEM (MMS/GSSS) MODCOMP DEVICE AND MAX 4 DEPENDENCY STUDY
Todd Welden (Computer Sciences Corp.), Michael McClellan (Computer Sciences Corp.), and Phillip D. Merwarth Dec. 1979 31 p refs
(NASA-TM-84796; STL-79-003; NAS 1.15:84796) Avail: Issuing Activity CSCL 09B

The hardware and software interfaces between the multimission modular spacecraft ground support software system (MMS/GSSS) and its MODCOMP IV/35 environment. The types of dependencies are identified and their extent is expressed in terms of the number of lines of code (i.e., FORTRAN vs. ASSEMBLER, modules vs. library) requiring modification. From this data estimates of the work effort required to transport the MMS/GSSS to another powerful minicomputer are derived. Finally, a strategy for the next stage of the dependency/compatibility/transport study is formulated. M.G.

N82-29028*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ORBIT DETERMINATION SOFTWARE DEVELOPMENT FOR MICROPROCESSOR BASED SYSTEMS: EVALUATION AND RECOMMENDATIONS
Charles M. Shenitz (Computer Sciences Corp.), Frank E. McGarry, and Keiji K. Tasaki Jul. 1980 95 p refs
(NASA-TM-84794; STL-80-001; NAS 1.15:84794) Avail: NTIS HC A05/MF A01 CSCL 09B

A guide is presented for National Aeronautics and Space Administration management personnel who stand to benefit from the lessons learned in developing microprocessor-based flight dynamics software systems. The essential functional characteristics of microprocessors are presented. The relevant areas of system support software are examined, as are the distinguishing characteristics of flight dynamics software. Design examples are provided to illustrate the major points presented, and actual development experience obtained in this area is provided as evidence to support the conclusions reached. Author

N82-29029*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE TWO-WAY TDRSS OBSERVATION MODEL FOR THE LSI-11/23 MICROCOMPUTER
Charles E. Goorevich (Computer Sciences Corp.) and Jerome Teles Jul. 1980 61 p refs
(NASA-TM-84793; NAS 1.15:84793) HC A04/MF A01 CSCL 09B

The mathematical specifications and software design for implementation of Tracking and Data Relay Satellite System (TDRSS) two-way range sum (TR2S) and Doppler (TD2S) observation and observation partial derivative models, designed for use with the LSI-11/23 microcomputer-based Automated Orbit Determination System (AODS), are presented. Author

N82-29030*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AUTOMATED ORBIT DETERMINATION SYSTEM (AODS) REQUIREMENTS DEFINITION AND ANALYSIS
Sharon R. Waligora (Computer Sciences Corp.), Charles E. Goorevich (Computer Sciences Corp.), Jerome Teles, and Rosemarna S. Pajerski Sep. 1980 171 p refs
(NASA-TM-84795; STL-80-003; NAS 1.15:84795) Avail: NTIS HC A08/MF A01 CSCL 09B

The requirements definition for the prototype version of the automated orbit determination system (AODS) is presented including the AODS requirements at all levels, the functional model as determined through the structured analysis performed during requirements definition, and the results of the requirements analysis. Also specified are the implementation strategy for AODS and the AODS-required external support software system (ADEPT), input and output message formats, and procedures for modifying the requirements. M.G.

N82-29031*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ALGORITHMS FOR AUTONOMOUS STAR IDENTIFICATION
Oct. 1980 38 p refs
(NASA-TM-84789; STL-80-004; NAS 1.15:84789) Avail: NTIS HC A03/MF A01 CSCL 09B

Algorithms for onboard autonomous star identification are presented. The algorithms are applicable to two types of spacecraft missions, those flown with nearly inertially fixed attitude (solar maximum mission type); and those flown with smoothly time varying attitude (LANDSAT-D type). M.G.

N82-29032*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SYSTEMS TECHNOLOGY LABORATORY (STL) LIBRARY METHODS AND PROCEDURES
Sep. 1981 59 p refs
(NASA-TM-84787; STL-81-001; NAS 1.15:84787) Avail: Issuing Activity CSCL 09B

The procedures to be followed when using or maintaining

three libraries available to users of the Systems Technology Laboratory (STL) are presented. The libraries contain the software tools, documents, and utilities which are frequently used in the STL. The procedures are designed to assure that the contents of each library are conveniently available to users of the STL to assist them in performing tasks related to research and advance planning in flight dynamics. Author

N82-29033*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

MATHEMATICAL SPECIFICATIONS OF THE ONBOARD NAVIGATION PACKAGE (ONPAC) SIMULATOR (REVISION 1)

Joan B. Dunham (Computer Sciences Corp.), Anne C. Long (Computer Sciences Corp.), and William Wooden Feb. 1981 63 p refs

(NASA-TM-84797; STL-81-002; NAS 1.15:84797) Avail: NTIS HC A04/MF A01 CSCL 09B

The mathematical theory of the computational algorithms employed in the onboard navigation package system is described. This system, which simulates an onboard navigation processor, was developed to aid in the design and evaluation of onboard navigation software. The mathematical formulations presented include the factorized UDU(T) form of the extended Kalman filter, the equations of motion of the user satellite, the user clock equations, the observation equations and their partial derivatives, the coodinate transformations, and the matrix decomposition algorithms. M.G.

N82-29034*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

SYSTEMS TECHNOLOGY LABOPATORY (STL) COMPENDIUM OF UTILITIES

William J. Decker (Computer Science Corp.), Elizabeth J. Smith (Computer Sciences Corp.), Wayne A. Taylor (Computer Sciences Corp.), Phillip D. Merwarth (Computer Sciences Corp.), Michael E. Stark (Computer Sciences Corp.), Rosemarna S. Pajerski, Frank E. McGarry, and Arthur L. Green Jul. 1981 110 p refs

(NASA-TM-84799; STL-81-003; NAS 1.15:84799) Avail: NTIS HC A06/MF A01 CSCL 09B

Multipurpose programs, routines and operating systems are described. Data conversion and character string comparison subroutine are included. Graphics packages, and file maintenance programs are also included. N.W.

N82-29035*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

AUTOMATED ORBIT DETERMINATION SYSTEM (AODS) ENVIRONMENT SIMULATOR FOR PROTOTYPE TESTING (ADEPT) SYSTEM DESCRIPTION

Aug. 1981 466 p refs

(NASA-TM-84801; STL-81-004; NAS 1.15:84801) Avail: Issuing Activity CSCL 09B

A system description for the automated orbit determination system (AODS) environment simulator for prototype testing (ADEPT) is presented. The ADEPT software provides all external support required by AODS to demonstrate, in a laboratory environment, the feasibility of using microprocessors to perform onboard orbit determination in an automated manner. A comprehensive description of the logical structure and modular arrangement of the ADEPT components is given. Also provided are an overview of ADEPT and its three major subsystems, subroutine descriptions, data flow and baseline diagrams, and descriptions of the ADEPT COMMON blocks, external data sets, input/output message formats, utility programs, computational models and system update procedures. M.G.

N82-29036*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

PRELIMINARY AUTOMATED ORBIT DETERMINATION SYSTEM (AODS)/AODS ENVIRONMENT SIMULATOR FOR PROTOTYPE TESTING (ADEPT) USER'S GUIDE

Sharon R. Waligora (Computer Sciences Corp.), Yaowe Ong (Computer Sciences Corp.), John E. Fry, Jr. (Computer Sciences Corp.), Barbara J. Prusiewicz (Computer Sciences Corp.), Rosemarna S. Pajerski, Keiji K. Tasaki, Frank E. McGarry, and Charles E. Goorevich Sep. 1981 175 p refs

(NASA-TM-84798; NAS 1.15:84798) HC A08/MF A01 CSCL 09B

A user's guide for the Autimated Orbit Determination System (AODS) and the AODS Environment Simulator for Prototype Testing (ADEPT) is presented. ADEPT provides all external support required by AODS to demonstrate, in a laboratory environment, the feasibility of using microprocessors to perform onboard orbit determination in a automated manner. This document presents an overview of, and a comprehensive user's guide for, these two systems. The user's guide includes user instructions for the three major subsystems in ADEPT, general operating instructions for performing simulations, detailed descriptions of all user input parameters, and user instructions for the utility programs that support ADEPT. Author

N82-29037*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

GPSPAC/LANDSAT-D INTERFACE (GLI) SYSTEM DESCRIPTION

Apr. 1982 382 p refs

(NASA-TM-84803; STL-82-001; NAS 1.15:84803) Avail: Issuing Activity CSCL 09B

The LANDSAT-D Interface (GLI) system is described. The GLI system is used for validation and calibration of GPSPAC performance on the LANDSAT-D satellite. Other portions of the system, including an ephemerides comparison procedure, a method for GPSPAC data reconstruction, a program to perform estimation with the reconstructed global positioning system data, and a means of reporting the results are also described. S.L.

N82-29038*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

GPSPAC/LANDSAT-D INTERFACE (GLI) SYSTEM USER'S GUIDE

Mar. 1982 96 p refs

(NASA-TM-84784; NAS 1.15:84784; STL-82-002) HC A05/MF A01 CSCL 09B

The user instructions for the programs of the global positioning subsystem experiment package (GPSPAC)/ LANDSAT-D interface system are present including the onboard navigation package (ONPAC), the data recombination (RECON), ephemerides comparison (COMPAR) and the data plotting (PLOT) programs. Instructions for the global positioning system experiment data preprocessor (GEDAP) software and various utility programs are also given. M.G.

N82-29039*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

SYSTEM DESCRIPTION FOR THE GLOBAL POSITIONING SUBSYSTEM EXPERIMENT PACKAGE (GPSPAC) EXPERIMENT DATA PREPROCESSOR (GEDAP)

Jun. 1982 135 p refs

(NASA-TM-84785; NAS 1.15:84785; STL-82-007) HC A07/MF A01 CSCL 09B

A system description for the global positioning subsystem experiment package (GPSPAC) experiment data preprocessor (GEDAP) software is presented. The GEDAP processes GPSPAC raw telemetry orbit data from tapes received from received from the LANDSAT-D project operations control center and generates data files to be used by other software packages. M.G.

N82-29040*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

STRUCTURED FORTRAN PREPROCESSOR (SFORT) PDP-11/70 USER'S GUIDE

Sep. 1978 20 p Prepared in cooperation with Computer Sciences Corp., Greenbelt, Md.

(NASA-TM-84790; SEL-78-004; NAS 1.15:84790) Avail: Issuing Activity CSCL 09B

Users of the Structured FORTRAN Preprocessor (SFORT) 11/70 are provided with the information needed to write programs using SFORT constructs. SFORT allows for the extension of the FORTRAN IV language, enabling a user to write structured, top-down, label-free, FORTRAN-like code. SFORT converts this extended FORTRAN into standard FORTRAN which can then be used as input to a compiler. Author

N82-29041*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

FORTRAN STATIC SOURCE CODE ANALYZER PROGRAM (SAP) USER'S GUIDE, REVISION 1
May 1982 107 p refs Prepared in cooperation with Computer Sciences Corp., Greenbelt, Md.
(NASA-TM-84791; SEL-78-102; NAS 1.15:84791) Avail: Issuing Activity CSCL 09B

The FORTRAN Static Source Code Analyzer Program (SAP) User's Guide (Revision 1), which was developed for the Goddard Space Flight Center Mission Support Computing and Analysis Division is presented. SAP is a software tool designed to assist Software Engineering Laboratory personnel in conducting studies of FORTRAN programs. SAP scans FORTRAN source code and produces reports that present statistics and measures of statements and structures that make up a module. Author

N82-29042*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MULTIMISSION MODULAR SPACECRAFT GROUND SUPPORT SOFTWARE SYSTEM (MMS/GSSS) STATE-OF-THE-ART COMPUTER SYSTEMS/ COMPATIBILITY STUDY
May 1980 68 p ref Prepared in cooperation with Computer Sciences Corp., Greenbelt, Md.
(NASA-TM-84792; SEL-80-003; NAS 1.15:84792) Avail: NTIS HC A04/MF A01

The compatibility of the Multimission Modular Spacecraft (MMS) Ground Support Software System (GSSS), currently operational on a ModComp IV/35, with the VAX 11/780 system is discussed. The compatibility is examined in various key areas of the GSSS through the results of in depth testing performed on the VAX 11/780 and ModComp IV/35 systems. The compatibility of the GSSS with the ModComp CLASSIC is presented based upon projections from ModComp supplied literature. Author

N82-29043*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AUTOMATED COLLECTION OF SOFTWARE ENGINEERING DATA IN THE SOFTWARE ENGINEERING LABORATORY (SEL)
Sep. 1981 73 p refs Prepared in cooperation with Computer Sciences, Corp., Greenbelt, Md.
(NASA-TM-84766; SEL-81-014; NAS 1.15:84766) Avail: Issuing Activity CSCL 09B

The collection of software engineering data is examined. The current manual collection of data via software engineering forms is evaluated with regard to what can and cannot be automated. Top level functional requirements for an automated system for the collection of software development statistics are presented. Author

N82-29044# Stanford Univ., Calif. Dept. of Computer Science.
THE LAST WHOLE ERRATA CATALOG
Donald E. Knuth 13 Jul. 1981 43 p
(Contract N00014-81-K-0269; Grants NSF MCS-77-23738; NSF IST-79-21977)
(AD-A112929; SU-STAN-CS-81-868) Avail: NTIS HC A03/MF A01 CSCL 09/2

This list supplements previous errata published in Stanford reports CS551 (1976) and CS712 (1979). It includes the first corrections and changes to the second edition of volume two (published January, 1981) as well as to the most recent printings of volumes one and three (first published in 1975). In addition to the errors listed here, about half of the occurrences of 'which' in volumes one and three should be changed to 'that'.
Author (GRA)

N82-29045# IIT Research Inst., Rome, N.Y.
ESTABLISHMENT OF THE DATA AND ANALYSIS CENTER FOR SOFTWARE (DACS) Final Technical Report, Aug. 1978 - Aug. 1981
Gary Caron, Douglas Cornwell, John Dobmeier, Lorraine Duvall, Shirley A. Gloss-Sloer, and Christopher Turner Griffiss AFB, N.Y. RADC Jan. 1982 172 p refs
(Contract F30602-78-C-0255; AF Proj. 2528)
(AD-A113262; RADC-TR-81-385) Avail: NTIS HC A08/MF A01 CSCL 09/2

The Data and Analysis Center for Software (DACS) has been established to serve as a central source for information and data on software technology. This final report presents the status of the DACS after the initial 36 months of development. Descriptions of the software engineering computer database and the technology information base are provided. This report also contains information on the types of products developed during this reporting period and the technical inquiries received relating to software technology. Author (GRA)

N82-29046# Defence Research Establishment, Ottawa. (Ontario).
PROGRAMMING GUIDE FOR COLOUR GRAPHICS ON THE NORPAK VDP/VGS AND VDP/RGS
Barbara J. Ford Dec. 1981 42 p refs
(AD-A113429; DREO-TN-81-25) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper describes the library of routines written in C language under UNIX on a PDP-11/34 for operating the NORPAK VDP/RGS (raster) and VDP/VGS (vector) colour graphic displays. The details of the routines which are pertinent to the user are described. A listing of the library of routines is included.
Author (GRA)

N82-29047# Naval Postgraduate School, Monterey, Calif.
SOFTWARE MAINTENANCE: IMPROVEMENT THROUGH BETTER DEVELOPMENT STANDARDS AND DOCUMENTATION Final Report, 1 Jan. 1980 - 1 Jan. 1982
Norman F. Schneidewind 22 Feb. 1982 45 p refs
(AD-A113257; NPS54-82-002) Avail: NTIS HC A03/MF A01 CSCL 09/2

Software maintenance is frequently the most expensive phase of the software life cycle. It is also the phase which has received insufficient attention by management and software developers. Software standards have improved the ability of the software community to develop and design software. Unfortunately, most standards do not deal with the maintenance phase in a substantive way. Since maintainability has to be designed into the software and cannot be achieved after the software is delivered, it is necessary to have software standards which explicitly incorporate requirements for maintainability. Accordingly, this report suggests design criteria for achieving maintainability and evaluates Weapons Specification WS 8506 and MIL-STD 1679 against these criteria. Using these documents as typical examples of military software standards, recommendations are made for improving the maintainability aspects of software standards.
Author (GRA)

N82-29048# Naval Research Lab., Washington, D. C. Computer Science and Systems Branch.
SOFTWARE ENGINEERING PRINCIPLES
Louis J. Chmura, Paul C. Clements, Constance L. Heitmeyer, Kathryn Heninger Britton, David L. Parnas, John E. Shore, David M. Weiss, and Janet Stroup Aug. 1981 581 p refs Proceedings of workshop held in Washington, 4-14 Aug. 1981 Prepared in cooperation with Naval Postgraduate School
(AD-A113415) Avail: NTIS HC A25/MF A01 CSCL 09/2

This is the notebook from the updated edition of the well-received course originated by the Naval Research Laboratory and taught annually for the past six years. It is a two-week technical course for personnel managing a software project or designing software. The purpose of the course is to improve the participant's ability to evaluate software requirements, specifications, design, correctness and maintainability. Its purpose is not to transform the participant into an expert software designer. The course concentrates on technical problems of software design. It introduces generally accepted design practices, as well as software design research that may result in practical design applications in the near future. Design for ease maintenance is emphasized. All course material is unclassified. Topics covered include information-hiding modules (modules that isolate the effects of changes), abstract interfaces (a technique for designing the interfaces of information-hiding modules), responses to undesired events, cooperating sequential processes (in real-time systems, software tasks in which scheduling and resource allocation decisions are not embedded), disciplined documentation techniques, techniques for formal specification, and designing systems with useful subsets. GRA

N82-29049# Naval Research Lab., Washington, D. C.
NUMERICAL SIMULATIONS OF MAGNETO-HYDRODYNAMIC CHEMICALLY REACTIVE FLOWS IN THREE-DIMENSIONS ON A VECTOR COMPUTER Interim Report
K. Hain and G. Hain 1 Apr. 1982 31 p refs Sponsored in part by Defense Nuclear Agency
(RR03300244)
(AD-A113487; NRL-MR-4782) Avail: NTIS HC A03/MF A01 CSCL 09/2

Extensive simulations of chemically reactive magneto-hydrodynamic flows have been performed at the Naval Research Laboratory. The paper discusses briefly the numerical scheme and the use of virtual disc storage. It shows how the data flow for the computation of chemical reactions is organized to achieve an optimal computing speed. As an example the plasma flow around the earth is simulated. The results show a detailed structure, therefore demonstrating the almost complete lack of diffusion. Author (GRA)

N82-29050# Princeton Univ., N. J. Dept. of Statistics.
ROBUST COMPARISON OF THREE-DIMENSIONAL SHAPES WITH AN APPLICATION TO PROTEIN MOLECULE CONFIGURATIONS
Andrew F. Siegel and John R. Pinkerton Mar. 1982 18 p refs
(Contract DAAG29-79-C-0205)
(AD-A113786; TR-217-SER-2; ARO-16669.17-M) Avail: NTIS HC A02/MF A01 CSCL 06/1

Robust statistical methods were recently shown to have desirable properties when used for the identification of similarities and differences in shape. A generalization of the two dimensional repeated median algorithm to three and higher dimensions is given. The extension is achieved using a duality between orthogonal and skew symmetric matrices, which permits the definition of a median of a collection of orthogonal matrices. The methods are illustrated by comparing the predicted three dimensional configuration of a protein molecule to a refined structure that was found using nuclear magnetic resonance techniques. Author (GRA)

N82-29051# Rochester Univ., N. Y. Div. of Biostatistics.
BGRAPH: A PROGRAM FOR BIPLOT MULTIVARIATE GRAPHICS. VERSION 1: USER'S GUIDE
Michael C. Tsianco, Charles L. Odoroff, Sandra Plumb, and K. Ruben Gabriel Sep. 1981 106 p refs
(Contract N00014-80-C-0387)
(AD-A114449; TR-81/20) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report is a user's manual for BGRAPH, an interactive, conversational program to perform multivariate graphics. The program generates 2- or 3-D graphical displays of biplots of data matrices factorized appropriately. These show various aspects of the biplot that have been found useful for visualizing data and for diagnosing models to fit data. It includes options for rotation, perspective and analglyph displays as well as concentration ellipses(oids) of subsets of points. BGRAPH is written in FORTRAN and is implemented on a DEC 10 under the TOPS 10 operating system. Graphic display is carried out through the system plot package of the NCAR graphics package. Author (GRA)

N82-29052# Ocean Data Systems, Inc., Rockville, Md.
COMPUTER SUPPORT TO NORDA CODES 520 AND 530 Final Contract Report
20 Apr. 1982 74 p refs
(Contract N00014-77-C-0165)
(AD-A114371) Avail: NTIS HC A04/MF A01 CSCL 09/2

From the start of this contract in 1977 to the date of this document, ODSI prepared 13 reports as the result of various computer systems related task efforts sponsored by NORDA 520 in support of NORDA 520 and 530 acoustics and environmental modelling activities. This document, as the Final Contract Report, contains the title page, foreword, abstract and table of contents for each of those 13 reports. These reports, in their entirety, are available upon request from ODSI. GRA

N82-29053# Harvard Univ., Cambridge, Mass. Computation Lab.
DECISION ALGORITHMS FOR MULTIPLAYER GAMES OF INCOMPLETE INFORMATION
John Reif and Gary Peterson (Rochester Univ.) Dec. 1981 37 p refs
(Contract N00014-80-C-0647; Grants NSF MCS-79-21024; NSF MCS-79-02971)
(AD-A114334; TR-34-81) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper provides algorithms for deciding the outcome for various classes of multilayer games of incomplete information. The classes of games which our algorithms are applicable include games not previously known decidable; furthermore, many of our algorithms have asymptotically optimal complexity. We apply our algorithms to provide alternative proofs of upper bounds, and new time-space tradeoffs on the complexity of multilayer alternating machines. GRA

N82-29054# Atmospheric Sciences Lab., White Sands Missile Range, N. Mex.
PROGRAM LISTINGS FOR EOSAEL 80-B AND ANCILLARY CODES AGAUS AND FLASH. VOLUME 2: USER'S MANUAL SUPPLEMENT Final Report
R. G. Steinhoff Feb. 1982 51 p refs
(DA Proj. 1H7-61211-AH-71)
(AD-A114417; ERADCOM/ASL-TR-0107-V2-Suppl) Avail: NTIS HC A04/MF A01 CSCL 04/1

Document contains a computer listing of the Electro-Optical Systems Atmospheric Effects Library, version 80-B. GRA

N82-29055# Naval Surface Weapons Center, Dahlgren, Va.
INPUTP (GENERAL PURPOSE INPUT PROCESSOR). USER GUIDE Final Report
Peter J. Goyette and Daniel J. Owens Mar. 1982 65 p refs
(AD-A114257; NSWC/DL-TR-3880) Avail: NTIS HC A04/MF A01 CSCL 09/2

The General Purpose Input Processor (INPUTP) program is a very flexible, entirely data-driven utility that may be used as an input preprocessor to any FORTRAN program. The INPUTP program reads two external files to define the names and default values for all user input. Then through input, the user may override the default values for any input parameters. The Input Processor generates either two FORTRAN block data routines containing DATA statements, or a binary data file, two FORTRAN read routines, and an output routine for printing the Initial Conditions Report. These routines must be compiled and loaded to initialize all input variables. All data area read by the Input Processor in a free-form format, which simplifies the creation and maintenance of the data files and greatly reduces the chances for user input errors. The INPUTP program is coded in the SIMSCRIPT 11.5 language, and is operational on the Control Data Corporation (CDC) 6700 computer system under the SCOPE 3.4 operating system. Author (GRA)

N82-29056*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AUTONOMOUS ONBOARD ATTITUDE DETERMINATION SYSTEM SPECIFICATIONS AND REQUIREMENTS
Malcolm D. Shuster (Computer Sciences Corp.), Surendra N. Ray (Computer Sciences Corp.), Lawrence P. Gunshol (Computer Sciences Corp.), Keiji K. Tasaki, Eugene Lefferts, Roger Werking, and Arthur Fuchs Dec. 1980 111 p refs
(NASA-TM-84800; NAS 1.15:84800; STL-80-005) Avail: Issuing Activity CSCL 09B

The requirements and specifications for an onboard microprocessor attitude determination system are developed for a free-flying, near-Earth spacecraft carrying either three-axis gyros and star trackers or three-axis gyros, Sun sensor, and horizon scanner. Probable operational scenarios are given. The functional specification and top-level design are sketched. The analytical operations which must be carried out are given in detail. Author

N82-29057# Los Alamos Scientific Lab., N. Mex.
WEIGHTING FACTORS IN THE DOE-2 COMPUTER PROGRAM
Jerry F. Kerrisk Jun. 1981 85 p refs Sponsored by DOE
(DE81-028593; LA-8886-MS) Avail: NTIS HC A05/MF A01

The DOE-2 computer program uses weighting factors for the calculation of thermal loads and air temperatures in buildings. The weighting factors, which represent parameters in a transfer functions, can be selected from data for typical rooms (precalculated weighting factors) or can be calculated for rooms in the particular building under consideration (custom weighting factors). The method used to calculate-custom weighting factors in DOE-2.1 is described. A preliminary discussion of z transforms and transfer function solutions to differential equations are discussed and a description of how the transfer functions and weighting factors for a room are obtained is presented. Models employed in the calculation of various types of weighting factors are outlined. DOE

N82-29058# Los Alamos Scientific Lab., N. Mex.
BICYCLE 2: A COMPUTER CODE FOR CALCULATING LEVELIZED LIFE-CYCLE COSTS
R. W. Hardie Nov. 1981 37 p ref Supersedes LA-8493-MS (Contract W-7405-eng-36)
(DE82-001865; LA-8909; LA-8493-MS) Avail: NTIS HC A03/MF A01

The BICYCLE computer code is described. The code was specifically designed to calculate levelized life cycle costs for plants that produce electricity, heat, gaseous fuels, or liquid fuels. Included are: (1) derivations of the equations used by BICYCLE, (2) input instructions, (3) sample case input, and (4) sample case output. DOE

N82-29059# Los Alamos Scientific Lab., N. Mex.
EOSMOD: A SUBROUTINE PACKAGE FOR CALCULATING EQUATIONS OF STATE AND OPACITIES
James M. Hyman and Morris M. Klein Oct. 1981 118 p refs (Contract W-7405-eng-36)
(DE82-004676; LA-8502-M) Avail: NTIS HC A06/MF A01

The EOSMOD package which includes a set of FORTRAN subroutines written to make the SESAME equation of state and opacity tables readily available is discussed. The routines have been made as assessible as possible for casual users with routine problems and allow sufficient flexibility for sophisticated users with complicated situations. This has caused only a slight loss in efficiency compared to using the SESAME routines directly. DOE

N82-29060# California Univ., Livermore. Lawrence Livermore Lab.
PRAXIS TEXT I/O PACKAGE: AN OVERVIEW OF THE PRAXIS ROUTINES TO HANDLE TEXT I/O
J. M. Duffy, J. R. Greenwood, and W. I. Nowicki (Stanford Univ.) 2 Dec. 1981 25 p
(Contract W-7405-eng-48)
(DE82-006250; UCID-19264) Avail: NTIS HC A02/MF A01

The package allows arrays of characters to be written to/from files and serial I/O devices. It is a straightforward set of definitions and procedures which accomplish reading and writing characters and lines of text. The Textio package is written in Praxis. It interfaces to the particular operating environment via the module Macio. Macio is usually written in the assembly language of the target machine. The data type and Textio definitions are discussed, and the procedures are described fully. T.M.

N82-29061# Stanford Linear Accelerator Center, Calif.
VIRTUAL MEMORY MANAGEMENT Ph.D. Thesis
R. W. Carr Sep. 1981 119 p refs
(Contract DE-AC03-76SF-00515)
(DE82-000908; SU-SLAC-244; SU-STAN-CS-81-873) Avail: NTIS HC A06/MF A01

Methods of scheduling, memory management, and load control in a virtual memory computer system and modeling virtual memory systems was studied. The two alternative classes, local and global, of virtual memory management policies are compared. In the area of scheduling, a multilevel, load balancing queue is described; this mechanism is useful for maintaining good response time in interactive systems and for managing central server in a distributed computer system. A new policy, the WSClock, is developed in the area of memory management. DOE

N82-29062# Sandia Labs., Albuquerque, N. Mex. Exploratory Chemistry Div.
FORTRAN 4 PROGRAM FOR CALCULATING X-RAY POWDER DIFFRACTION PATTERNS VERSION 9/10
Deane K. Smith and Monte C. Nichols Sep. 1981 37 p refs (Contract DE-AC04-76DP-00789)
(DE82-003893; SAND-81-8226) Avail: NTIS HC A03/MF A01

The POWD7/8 version of a program to calculate X-ray powder diffraction patterns was implemented on the CDC 6600 and several changes were incorporated. The data files used by the POWD program were updated to include the most recently determined scattering factor values. X-ray atomic scattering factors from a variety of sources were included and are given both in tabular form in intervals of (Sin theta), and as coefficients for the Cromer and Mann analytical expression. Scattering factors for electron diffraction were also obtained from several sources, but are only available in tabular form. Anomalous scattering factors have been added for Fe, Co, Ni, and Cu for Cu K(beta) radiation. Mass absorption coefficients for all the common K(beta) wavelengths have also been added. A program COMBIN was written to simulate patterns of mixtures using patterns of individual compounds prepared by POW10. DOE

N82-29063# Oak Ridge National Lab., Tenn. Instrumentation and Controls Div.
COMPUTER-GENERATED SPEECH
Y. Aimthikul Dec. 1981 100 p refs
(Contract W-7405-eng-26)
(DE82-004672; ORNL/TM-8096) Avail: NTIS HC A05/MF A01

This thesis reviews the essential aspects of Speech synthesis is discussed and the two prevailing techniques: compressed digital speech and phonemic synthesis are distinguished. The hardware details of the five speech modules evaluated are presented. FORTRAN programs were written to facilitate message creation and retrieval with four of the modules driven by a PDP-11 minicomputer. The fifth module was driven directly by a computer terminal. The compressed digital speech modules, each contain a limited vocabulary, while both the phonemic synthesizers permit an almost unlimited set of sounds and words. A test to phoneme rules program was adapted for the PDP-11 (running under the RSX-11M operating system) to drive the speech pac module. However, the talk unit has its own built in translator. Comparison of these modules revealed that the compressed digital speech modules were superior in pronouncing words on an individual basis but lacked the inflection capability that permitted the phonemic synthesizers to generate more coherent phrases. DOE

N82-29064# Sandia Labs., Albuquerque, N. Mex. Computational Physics and Mechanics Div.
PARSER: A TOOL FOR COMMAND INTERPRETATION
Colin B. Selleck Nov. 1981 12 p
(Contract DE-AC04-76DP-00789)
(DE82-006829; SAND-81-2193) Avail: NTIS HC A02/MF A01

The usefulness of a command parser for interactive systems is discussed. It is designed to give an application programmer the ability to write code that will quickly determine if the user of an interactive program has given a valid command. It is also useful in parsing character data stored in a file. This is done by parsing the input character string and placing its components and related information into arrays stored in common blocks. The code is written in the structured programming language RATFOR. The output from the RATFOR processor is FORTRAN; and in the case of PARSER, this FORTRAN is ANSI standard FORTRAN 77. DOE

N82-29065# Japan Atomic Energy Research Inst., Tokyo.
PROGRAM PACKAGE FOR SOLVING LINEAR OPTIMIZATION PROBLEMS. USER'S MANUAL
K. Horikami, T. Fujimura, and Y. Nakahara Sep. 1980 47 p refs
(DE81-700125; JAERI-M-9048) Avail: NTIS (US Sales Only) HC A03/MF A01; DOE Depository Libraries

Seven computer programs for the solution of linear, integer and quadratic progamming (four programs for linear programming, one for integer programming and two for quadratic programming) were prepared and tested on FACOM M200 computer, and auxiliary programs were written to make it easy to use the

optimization program package. The characteristics of each program are explained and the detailed input/output descriptions are given in order to let users know how to use them. DOE

N82-29066# Fondazione Ugo Bordoni, Rome (Italy).
POLYNOMIAL SIGNALS AND POLYNOMIAL TRANSFORMATIONS [SEGNALI POLINOMIALI E TRASFORMATE POLINOMIALI]
Giuseppe Martinelli (Rome Univ.), Gianni Orlandi (Rome Univ.), and Mario Salerno (Rome Univ.) Dec. 1981 24 p In ITALIAN
(FUB-28-1981) Avail: NTIS HC A02/MF A01

The characteristics of the polynomial transformation are explained and its application to the calculation of the convolution integral or the discrete Fourier transformation of two dimensional polynomial signals is described. The calculation of one dimensional convolutions with polynomial transformations is also analyzed. In this case the requirement of using polynomial signals reduces the efficiency of the method. A block diagram of the computer program used for the computation of two dimensional convolutions with polynomial transformations is presented. Author (ESA)

62 COMPUTER SYSTEMS

Includes computer networks.

N82-29067# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
DISTRIBUTED OPERATING SYSTEM DESIGN STUDY, VOLUME 1 Final Technical Report, 12 Jul. 1979 - 1 May 1981
Harry C. Forsdick, William I. MacGregor, Richard E. Schantz, Steven A. Swernofsky, Robert H. Thomas, and Stephen G. Toner Griffiss AFB, N.Y. RADC Jan. 1982 273 p refs 2 Vol.
(Contract F30602-79-C-0193; AF Proj. 5581)
(AD-A113172; BBN-4674-Vol-1; RADC-TR-81-384-VOL-1) Avail: NTIS HC A12/MF A01 CSCL 09/2

Three specific issues regarding the design of an operating system to control information processing resources distributed throughout a network of computers were investigated. These issues are: (1) Techniques which can be used to maintain processing continuity of the distributed system; (2) The policies and mechanisms to be used for resource allocation among system processes; and (3) Characteristics which constituent computers should possess to be cooperative elements with a distributed system. Resource allocation policies are discussed and simulation of several resource allocation schemes were completed. In addition, individual techniques to provide for processing continuity are described along with a description of how these techniques could be applied to system operation. Lastly, recommendations for future relating to the above issues is provided. GRA

N82-29068# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
DISTRIBUTED OPERATING SYSTEM DESIGN STUDY, VOLUME 2 Final Technical Report, 12 Jul. 1979 - 1 May 1981
Harry C. Forsdick, William I. MacGregor, Richard E. Schantz, Steven A. Swernofsky, Robert H. Thomas, and Stephen G. Toner Griffiss AFB, N.Y. RADC Jan. 1982 273 p refs 2 Vol.
(Contract F30602-79-C-0193; AF Proj. 5581)
(AD-A113173; BBN-4674-Vol-2; RADC-TR-81-384-VOL-2) Avail: NTIS HC A12/MF A01 CSCL 09/2

This report presents the results of the second phase of the Distributed Operating System Design Study. The goal of this project is to advance the state of the art in several important distributed operating system (DOS) design areas. These areas include global system control and scheduling, failure detection and recovery, and features desirable for hosts that must operate in a DOS. Part of the effort is to characterize these design areas by identifying issues and problems related to each. After the problems are identified approaches and solutions to them suitable for use in DOS designs are to be developed. Topics covered include: Goals for the DOS Design; Basic DOS Architecture; A DOS Reliability System; Resource Management in Distributed Systems; and A Simulation Model. GRA

N82-29069# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
DECENTRALIZED RESOURCE MANAGEMENT IN DISTRIBUTED COMPUTER SYSTEMS Final Technical Report, May - Oct. 1980
Hugh L. Applewhite, Roli Garg, E. Douglas Jensen, J. Duane Northcutt, Lui Sha, and James W. Wendorf Griffiss AFB, N.Y. RADC Feb. 1982 94 p refs Sponsored in part by Natural Science and Engineering Research Council of Canada
(Contract F30602-78-C-0099; AF Proj. 5581)
(AD-A113255; RADC-TR-81-203) Avail: NTIS HC A05/MF A01 CSCL 09/2

This is the first technical report from The Archons project, which is performing research in the science and engineering of 'distributed computers'. By this we mean a computer having highly decentralized (e.g., consensus) resource management at every level of abstraction from the executive down. This report provides a snapshot of several incomplete, ongoing investigations: decentralized synchronization; the requirements for simulation of decentralized resource management algorithms; and the facilities to be provided by a decentralized executive. We begin with a summary of our views on decentralized resource management and control, and the implications of physical communications on control (especially at the executive level). Then we briefly survey several other distributed system projects. This brings the Archons project into closer focus, as their orientations and objectives are considerably different from ours. Synchronization (the induction of a common, consistent ordering on events) is the essence of decentralized control. New concepts and techniques are required to achieve synchronization in distributed computers without reliance on any decentralized entity such as a semaphore, monitor, sequencer, or bus arbiter. GRA

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support*.

N82-29070# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
DISCRETE CONTROL OF CONTINUOUS PROCESSES Final Report, 1 Oct. 1980 - 30 Sep. 1981
Timothy L. Johnson and Martin E. Kaliski (Northeastern Univ.) Nov. 1981 77 p refs
(Contract F49620-80-C-0002; AF Proj. 2304)
(AD-A113839; LIDS-FR-1165; AFOSR-82-0300TR) Avail: NTIS HC A05/MF A01 CSCL 09/4

Canonical realization and synthesis of synchronous coders (mappings of real-valued input sequences to discrete-valued output sequences) have been achieved. Equivalent characterization of such coders as mappings, hybrid automata and real language acceptors have been established. Practical device synthesis procedures have been given for a significant class of such mappings. Regularity results have been developed for more general classes of coders. Algorithms for control design of synchronous systems with piecewise-continuous transition mappings, which employ new aggregation results along with the foregoing synthesis results have been derived. Unlike previous methods, these algorithms encompass coder/decoder specification and produce designs which are directly implementable as automata. Preliminary results have been obtained for asynchronous coders and controllers. It has been shown that a certain class of asynchronous multitasking systems admit realization as hybrid synchronous systems and are hence amenable to the methods of analysis developed for synchronous control systems. The concepts employed for synchronous coders may be generalized to the asynchronous case, but the specific form of the results differs. Qualitative properties of a class of piecewise-constant systems have been established. Author (GRA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N82-29071# Los Alamos Scientific Lab., N. Mex.
SOME NEW MULTIVARIATE DISTRIBUTIONS WITH ENHANCED COMPARISONS VIA CONTOUR AND THREE DIMENSIONAL PLOTS
Mark E. Johnson, Maurice C. Bryson, and Carolyn F. Mills Jul. 1981 60 p refs
(LA-8903-MS) Avail: NTIS HC A04/MF A01

Some new continuous multivariate probability distributions are illustrated with contour and three dimensional plots. These distributions are developed by Bryson and Johnson and are based on a construction scheme employing Khintchine's Theorem.
Author

N82-29072# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
HIGH-ORDER TERMS IN SENSITIVITY ANALYSIS THROUGH A DIFFERENTIAL APPROACH
Arie Dubi and Donald J. Dudziak Jun. 1981 23 p refs Sponsored by DOE
(LA-8813-MS) Avail: NTIS HC A02/MF A01

A differential approach to sensitivity analysis was developed that eliminates some difficulties existing in previous work. The development leads to simple explicit expressions for the first order perturbation as well as any higher order terms. The higher order terms are dependent only on differentials of the transport operator, the unperturbed flux, the adjoint flux, and the unperturbed Green's function of the system.
M.G.

N82-29073# RAND Corp., Santa Monica, Calif.
ARE ROBUSTNESS MEASURES ROBUST
R. Yilmaz Argueden Jan. 1982 22 p refs Presented at RGI Tutorial: Robustness in Operations Res., 1981
(RAND/P-6734) Avail: NTIS HC A02/MF A01

To a large degree, the classical approach to problem solving in operations research (OR) is to fit a real life situation into a well-known OR model. When OR models are used to deal with major policy problems in which the underlying processes are not well understand, this effort results in too much simplification. Due to an inability to perceive all uncertainties, and a consequent wish to retain flexibility once the decisions are made, decisionmakers are more interested in the robustness of their policy decisions than their optimality, which becomes a vague concept due to the nature of these problems. This paper emphasizes the desirability of robustness and criticizes attempts to fit an operationalized measure of robustness into an optimization structure, by the aid of a decision analytic example. Author

N82-29074*# Stanford Univ., Calif. Joint Inst. for Aeronautics and Acoustics.
ON THE POWER OUTPUT OF SOME IDEALIZED SOURCE CONFIGURATIONS WITH ONE OR MORE CHARACTERISTIC DIMENSIONS
Harold LeVine May 1982 55 p refs
(Contract NCC2-76)
(NASA-CR-169132; NAS 1.26:169132; SU-JIAA-TR-46) Avail: NTIS HC A04/MF A01 CSCL 12A

The calculation of power output from a (finite) linear array of equidistant point sources is investigated with allowance for a relative phase shift and particular focus on the circumstances of small/large individual source separation. A key role is played by the estimates found for a twin parameter definite integral that involves the Fejer kernel functions, where N denotes a (positive) integer; these results also permit a quantitative accounting of energy partition between the principal and secondary lobes of the array pattern. Continuously distributed sources along a finite line segment or an open ended circular cylindrical shell are considered, and estimates for the relatively lower output in the latter configuration are made explicit when the shell radius is small compared to the wave length. A systematic reduction of diverse integrals which characterize the energy output from specific line and strip sources is investigated.
S.L.

N82-29075# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ACCELERATION OF CONVERGENCE OF VECTOR SEQUENCES
Avram Sidi (Technion-Israel Inst. of Technology, Haifa), William F. Ford, and David A. Smith (Duke Univ.) 1982 10 p refs Presented at the 30th Anniv. Meeting of the Soc. for Ind. and Appl. Math., Stanford, Calif. 19-23 Jul. 1982
(NASA-TM-82931; E-1324; NAS 1.15:82931) Avail: NTIS HC A02/MF A01 CSCL 12A

A general approach to the construction of accelerated convergence methods for vector sequences is proposed. A simplified version of minimal polynomial extrapolation is emphasized. The convergence of this method is analyzed and it is shown that it is especially suitable for accelerating the convergence of vector sequences that are obtained when one solves linear systems of equations iteratively.
M.G.

N82-29076# Bedford Research Associates, Mass.
IMPACT OF FINITE PRECISION ARITHMETIC ON ALGORITHM DESIGN, PART 1
P. Tsipouras 3 Aug. 1981 13 p
(Contract F19628-80-C-0124; AF Proj. 6210)
(AD-A113981; SR-3; AFGL TR-81-0216) Avail: NTIS HC A02/MF A01 CSCL 12/1

Discussed briefly is floating point computation as performed on a typical digital computer. Our objective is two-fold: to illustrate the peculiarities of arithmetic in such an environment caused by the imprecise representation of the real number system, and to indicate how various choices in representation and arithmetic algorithms impinge on mathematical software.
GRA

N82-29077# Pittsburg Univ., Pa. Dept. of Mathematics and Statistics.
MULTIVARIATE ANALYSIS AND ITS APPLICATIONS Final Report, 1 Jun. 1979 - 14 Dec. 1981
P. R. Krishnaiah Dec. 1981 26 p
(Contract F49620-79-C-0161; AF Proj. 2304)
(AD-A113027; AFOSR-82-0271TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report covers the work done under the contract F49620-79-C-0161 during the period of June 1, 1979 - Dec. 14, 1981. All this work is reported in various papers and the abstracts of these papers are attached. The work in these papers is supported completely or partially by the above contract.
Author (GRA)

N82-29078# Boeing Computer Services Co., Tukwila, Wash.
IMPLEMENTATION OF THE GIBBS-POOLE-STOCKMEYER ALGORITHM AND THE GIBBS-KING ALGORITHM
John Gregg Lewis Jan. 1982 20 p refs
(Contract F49620-81-C-0072; AF Proj. 2304)
(AD-A113104; AFOSR-82-0264TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

Implementations of two effective matrix reordering algorithms were published in this paper as Algorithms 508, which implements the Gibbs-Poole-Stockmeyer algorithm for reducing the bandwidth of a matrix, and 509, which implements the Gibbs-King algorithm for reducing the profile of a matrix. Reduction of matrix profile is more often required than bandwidth reduction, but Algorithm 509 is substantially slower than Algorithm 508. Consequently, the Gibbs-Poole-Stockmeyer algorithm has been recommended and used in contexts where the better profile reduction provided by the Gibbs-King algorithm would be more appropriate. In addition, Algorithms 508 and 509 both contain unnecessary restrictions on problem size and provide little error checking. The authors describe a new FORTRAN implementation of both reordering algorithms which is portable, faster, more reliable and uses less storage than the original implementations. The new implementation of the Gibbs-King algorithm is much faster than Algorithm 509, generally slightly faster than Algorithm 508 and nearly as fast as the new implementation of the Gibbs-King-Stockmeyer algorithm.
Author (GRA)

N82-29079# Clark Coll., Atlanta, Ga. Dept. of Mathematics.
SUMMABILITY METHODS FOR DIVERGENT INTEGRALS AND THEIR APPLICATIONS TO SINGULAR STURM-LIOUVILLE EXPANSIONS Final Report

Louise A. Raphael 26 Feb. 1982 29 p refs
(Grant AF-AFOSR-0075-81; AF Proj. 2304)
(AD-A113077; AFOSR-82-0261TR) Avail: NTIS HC A03/MF A01 CSCL 12/1

These two papers continue the investigation of the Stieltjes summability method, its generalizations and their application to summing singular Sturm-Liouville (S-L) eigenfunctions.
Author (GRA)

N82-29080# Illinois Univ., Chicago. Dept. of Quantitative Methods.

MULTI-SAMPLE CLUSTER ANALYSIS WITH VARYING PARAMETERS USING ALKAIKE'S INFORMATION CRITERION

Hamparsum Bozdogan and Stanley L. Sclove 8 Mar. 1982 29 p refs Presented at the Spec. Sess. on Cluster Anal., 789th Meeting, Am. Math. Soc., Amherst, Mass., 16-18 Oct. 1981
(Contract N00014-80-C-0408; NR Proj. 042-443)
(AD-A113422; TR-82-2) Avail: NTIS HC A03/MF A01 CSCL 12/1

Multi-sample cluster analysis, the problem of grouping samples, is studied from an information-theoretic viewpoint via Akaike's Information Criterion (AIC). This criterion combines the maximum value of the likelihood with the number of parameters used in achieving that value. The multi-sample cluster problem is defined, and AIC is developed for this problem. The form of AIC is derived in the univariate model with varying means and variances, and in the multivariate model with varying mean vectors and variance-covariance matrices. Numerical examples are presented and results are shown to demonstrate the utility of AIC in identifying the best clustering alternatives. Author (GRA)

N82-29081# Naval Underwater Systems Center, New London, Conn. Submarine Sonar Dept.

FITTING A POLYNOMIAL TO DATA IN THE PRESENCE OF NOISE

Norman L. Owsley, John F. Law, Andrew A. Lesick, and Gerald R. Swope 6 Feb. 1982 25 p refs
(AD-A112984; NUSC-TR-6569) Avail: NTIS HC A02/MF A01 CSCL 12/1

Polynomial models arise in numerous applications in signal processing dealing with the estimation of continuous functions of either space or time. The requirement to interpolate between discrete noisy data points is of particular interest. In this report, the general-order polynomial time-varying coefficient-estimation problem is formulated and a structure is indicated for implementation of the coefficient-estimation process. Both the maximum likelihood (ML) and maximum a posteriori (MAP) estimation coefficient estimators are derived and the corresponding analyses of variance are obtained. The cases of measurement data consisting of samples of either the polynomial directly or the polynomial slope in the presence of additive noise are considered. Finally, expressions for the sensitivity to uncompensated measurement bias of the estimator standard deviations are obtained. GRA

N82-29082# Texas Univ., Austin. Center for Cybernetic Studies.

UNCONSTRAINED MINIMIZATION BY INTERPOLATION: RATES OF CONVERGENCE

J. Barzilai Aug. 1981 16 p refs
(Contract N00014-75-C-0569)
(AD-A114115; CCS-411) Avail: NTIS HC A02/MF A01 CSCL 12/1

We analyze the rate of convergence of a class of algorithms based on n-dimensional interpolation. In particular, we present a class of algorithms which use first order information only, while maintaining quadratic convergence. Author (GRA)

N82-29083# Texas Univ., Austin. Center for Cybernetic Studies.

THE BEST PARAMETER SUBSET USING THE CHEBYCHEV CURVE FITTING CRITERION

A. Armstrong and P. Beck Sep. 1981 23 p refs
(Contract N00014-75-C-0569)
(AD-A114327; CCS-412) Avail: NTIS HC A02/MF A01 CSCL 12/1

The Chebychev (also Minimax and L to infinity Norm) criterion has been widely studied as a method for curve fitting. Published computer codes are available to obtain the optimal parameter estimates to fit a linear function to a set of given points under the Chebychev criterion. The purpose of this paper is to study procedures for obtaining the best subset of k parameters from a given set of m parameters where k is less-than-or-equal-to m.
GRA

N82-29084# Oak Ridge National Lab., Tenn. Computer Sciences Div.

COMPARISON OF SOME METHODS FOR SOLVING SPARSE LINEAR LEAST SQUARES PROBLEMS

A. George, M. T. Heath, and Esmond Ng Nov. 1981 28 p refs
(Contract W-7405-eng-26)
(DE82-004651; ORNL/CSD-87) Avail: NTIS HC A03/MF A01

The method of normal equations, the Peters-Wilkinson algorithm and an algorithm based on Givens rotations for solving large sparse linear least squares problems are discussed and compared. Numerical experiments show that the method of normal equations should be considered when the observation-matrix is sparse and numerical stability is not important. However, if numerical stability is a major issue, the algorithm based on Givens rotations is then preferable. DOE

N82-29085# Sandia Labs., Albuquerque, N. Mex. Numerical Analysis Div.

INVERSE OF A LAPLACE TRANSFORM AND ITS NUMERICAL EVALUATION

Donald E. Amos Nov. 1981 25 p refs
(Contract DE-AC04-76DP-00789)
(DE82-004667; SAND-81-2470) Avail: NTIS HC A02/MF A01

The inverse transform of f(s) = (INTEGRAL) (s) + a/s((INTEGRAL) (s) + a + b (INTEGRAL) (s+c)) a greater than or equal to 0, b greater than or equal to 0, c greater than or equal to 0 is derived using the complex inversion integral. The results are expressed in terms of slowly convergent real integrals which can be converted into more rapidly convergent integrals by evaluating dominant parts analytically. These more rapidly convergent integrals, containing only elementary functions, are suitable for evaluation by numerical quadrature. An alternate form of the inversion is also derived in terms of a convolution integral whose integrand contains an error function. This integral can also be evaluated by numerical quadrature. However, when b(2) > 1 + a(2)/c, the error function becomes complex, making a numerical integration more difficult since complex error functions are not always readily available. DOE

N82-29086# Japan Atomic Energy Research Inst., Tokyo. Div. of High Temperature Engineering.

CALCULATION OF LINEAR STABILITY WITH THE AID OF ASYMPTOTIC SOLUTIONS OF ORR-SOMMERFELD EQUATION. PART 1. THE TREATMENT OF THE LINEAR STABILITY PROBLEMS FOR (ALPHA)R>> 1 CONTAINING ONE SIMPLE TURNING POINT; TWO DIMENSIONAL QUASI-PARALLEL FLOW: JEFFERY-HAMEL FLOW

Kaoru Fujimura Nov. 1980 17 p refs In JAPANESE; ENGLISH summary
(DE81-700130; JAERI-M-9164) Avail: NTIS (US Sales Only) HC A05/MF A01; DOE Depository Libraries

The numerical treatment of the Orr-Sommerfeld equation which is the fundamental equation of linear hydrodynamic stabiity theory is described. A calculation procedure is applied to the two dimensional quasi-parallel flow for which the linearized disturbance equation (Orr-Sommerfeld equation) contains one simple turning point and (alpha)R>> 1. The numerical procedure of this problem and one numerical example for Jeffery-Hamel flow (J-H III sub 1) are presented. This treatment can be extended to the other velocity profiles by slight modifications. DOE

N82-29087# Fondazione Ugo Bordoni, Rome (Italy).

FUNDAMENTALS OF NUMBER THEORY AND POLYNOMINALS ALGEBRA FOR NUMERICAL SIGNAL PROCESSING [FONDAMENTI DI TEORIA DEI NUMERI E DI ALGEBRA

DEI POLINOMI PER L'ELABORAZIONE NUMERICA DEI SEGNALI]
Gianni Orlandi (Rome Univ.) Dec. 1981 54 p refs In ITALIAN
(FUB-27-1981) Avail: NTIS HC A04/MF A01

The discrete Fourier transform applied to numerical signal processing demands an excessive number of operations when the sample size is large. Successive improvements yielded the fast Fourier transform and lately some ideas derived from the Chinese rest theorem, such as the Winograd Fourier transform algorithm and the polynominal transform. The elements necessary to the comprehension of these algorithms are presented and the relative efficiency when compared to the traditional discrete Fourier transform is examined. Author (ESA)

N82-29088# Research Inst. of National Defence, Linkoeping (Sweden).
OTT: A COMPUTER AIDED GROUND WAVE MODEL FOR THE VHF RANGE IN HILLY TERRAIN WITH VARYING GROUND CHARACTERISTICS
Goeran Engdahl Mar. 1982 30 p refs In SWEDISH; ENGLISH summary
(FOA-C-30265-E2) Avail: NTIS HC A03/MF A01

Performance and the potential possibilities of a computer assisted ground wave propagation model, called OTT, were investigated through studies of its mathematical and physical background and of its numerical properties. A development of this method for the case when both emitter and receiver are elevated over the ground level was implemented. Calculation examples are given for wave propagation in hilly terrain with a Gauss-shaped barrier and over land-sea-land. Results show that the OTT model is applicable for computing the transmission loss over hilly terrain for frequencies including the VHF range.
Author (ESA)

N82-29089# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
A NUMERICAL METHOD FOR ANALYTIC CONTINUATION OF CONFORMAL MAPPINGS
Lothar Reichel 1981 26 p refs
(TRITA-NA-8118) Avail: NTIS HC A03/MF A01

A numerical analytic continuation of holomorphic functions is obtained by solving an initial value problem for the Cauchy-Riemann equations. The method is applied to computing conformal mappings and determining their analytic continuations. Let Omega denote a bounded, open, simply connected domain in the complex plane, C. Assume the boundary (partial differentiation Omega) is an analytic curve. Let D be the unit disk. By Z = F (w), a conformal mapping from D onto Omega is denoted. The analyticity of (partial differentiation Omega) assures that F(w) can be continued analytically across every point of the unit circle. Two problems, assuming F(w) is known on modulus w = 1, are considered: (1) determine the analytic continuation of F(w) into C for D, and (2) determine F(w) in D. For both problems, a solution is computed by a finite difference method. Author (ESA)

N82-29090# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
SOME COMPUTATIONAL ASPECTS OF THE BOUNDARY COLLOCATION METHOD FOR LINEAR PARTIAL DIFFERENTIAL EQUATIONS AND RELATED QUESTIONS
Lothar Reichel 1981 10 p refs
(TRITA-NA-8119) Avail: NTIS HC A02/MF A01

Numerical properties of the boundary collocation method in applied mathematics are summarized. The determination of boundary collocation points for solving some problems for the Laplace operator is discussed. Polynomial approximation in the complex plane with applications to conformal mapping is considered along with some computational aspects of rational approximation in the complex plane. Solving an interface problem for the Laplace operator by the boundary collocation method and a fast method for solving certain integral equations of the first kind with application to conformal mappings are treated. A numerical method for analytic continuation of conformal mappings is also mentioned. Author (ESA)

N82-29091# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
ERROR PROPAGATION IN STIFF DIFFERENTIAL SYSTEMS OF SINGULAR PERTURBATION TYPE
Gustaf Soederlind and Germund Dahlquist 1981 38 p refs
(TRITA-NA-8108) Avail: NTIS HC A03/MF A01

A nonautonomous linear system is taken as a model problem for the investigation of the error propagation in the discretization of a stiff differential equation of singular perturbation type: dy/dt = f(t,y,z); epsilon dz/dt = g(t,y,z) epsilon is much less than 1. A partitioned analysis of the error propagation is given, using the theory of G-contractivity. Results show that it is advantageous to use different methods for the two subsystems. The method used for the second equation need only have good stability properties while the other method can be chosen primarily to give high accuracy. Author (ESA)

N82-29092# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
MULTIPLE STEP G-CONTRACTIVITY WITH APPLICATIONS TO SLOWLY VARYING LINEAR SYSTEMS
Gustaf Soederling 1981 24 p refs
(TRITA-NA-8107) Avail: NTIS HC A02/MF A01

The possibility of constructing contractivity sets which correspond to the notion of stiff stability is explored. The contractivity set K should have three properties: (1) zero belongs to K, i.e., zero-contractivity; (2) A(zero)-contractivity; and (3) [q belongs to a set of complex numbers: Re q < or = negative beta] is contained in K, beta > or = zero. Only fixed-h G-contractivity is considered, restricting attention to stiffly stable one-leg methods. A k-step method (rho, sigma) is said to be G-contractive with respect to inner product norm sub G if the solution to the linear test equation satisfies certain criteria. It is recalled that K sub G which is a subset of the stability set, is a circular domain. As a consequence, K sub G cannot contain the set of all negative numbers unless (rho, sigma) is A-stable. By constructing a transformed method (rho*, sigma*), the step number of which is an integer multiple of k, a G norm with a noncircular constractivity set, corresponding to the notion of stiff stability, is constructed. Author (ESA)

N82-29093# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Numerical Analysis and Computing Science.
ON THE CONTRACTIVITY REGION OF RUNGE-KUTTA METHODS
Huang Mingyou 1981 16 p refs
(TRITA-NA-8106) Avail: NTIS HC A02/MF A01

The contractivity region in the set of all complex numbers in m of an m-stage Runge-Kutta method is defined. If it contains (the set of all negative complex numbers in m) the method is called AN-contractive. Algebraic stability is necessary and sufficient for this. Contractivity in an arbitrarily small semineighborhood of the origin is sufficient for AN-contractivity. The intersection of the contractivity region and a coordinate plane is either a circular domain or the whole plane. Author (ESA)

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N82-29094*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A BIVARIATE GAMMA PROBABILITY DISTRIBUTION WITH APPLICATION TO GUST MODELING
C. E. Smith, S. I. Adelfang (Computer Sciences Corp.), and J. D. Tubbs (Arkansas Univ., Fayetteville) Jul. 1982 101 p refs
(NASA-TM-82483; NAS 1.15:82483) Avail: NTIS HC A06/MF A01 CSCL 12A

A five-parameter gamma distribution (BGD) having two shape parameters, two location parameters, and a correlation parameter is investigated. This general BGD is expressed as a double series and as a single series of the modified Bessel function. It reduces to the known special case for equal shape parameters. Practical functions for computer evaluations for the general BGD and for special cases are presented. Applications to wind gust modeling for the ascent flight of the space shuttle are illustrated. M.G.

N82-29095# New Mexico Univ., Albuquerque.
SMALL SAMPLE PROPERTIES OF ROBUST ANALYSIS OF VARIANCE FOR FIXED AND RANDOM EFFECTS MODELS Final Report, 1 May 1979 - 30 Apr. 1981
Ronald M. Schrader and Joseph W. McKean Apr. 1982 7 p refs
(Contract DAAG29-79-C-0022)
(AD-A113877; ARO-16064.4-M) Avail: NTIS HC A02/MF A01 CSCL 12/1

The major shortcoming of robust methodology in statistical linear models has been a limitation primarily to parameter estimation in fixed effects models. The major competitor, classical least squares methodology, by contrast offers a unified treatment of estimation, testing, and multiple comparisons techniques in a wide range of fixed and random effects models. Research efforts have been directed toward filling the void in robust methods in order to provide a complete alternative to least squares procedures. This report summarizes the results. Author (GRA)

N82-29096# Clemson Univ., S.C. Dept. of Mathematical Sciences.
THE BASKET METHOD FOR SELECTING BALANCED SAMPLES. PART 2: APPLICATIONS TO PRICE ESTIMATION
K. T. Wallenius Dec. 1981 56 p refs
(Contract N00014-75-C-0451; NR Proj. 365-049)
(AD-A112949; N132; TR-377-Pt-2; NPS-NCAR-81-1-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 12/1

The Basket Method of sampling, a tool designed to achieve statistically balanced samples, is described in intuitive terms. Special reference is made to applications in price analysis where experience has demonstrated the practicality of the technique. The intent is to provide an overview of what the system is intended to do and how it does it in order to assist price analysts and negotiators expedite proposal processing while maintaining acceptable levels of risk. Guidelines and examples are given for implementing a statistical pricing program tailored to local conditions. Underlying theory and documented computer codes are provided separately in Part I and Part III, respectively.
Author (GRA)

N82-29097# Navy Personnel Research and Development Center, San Diego, Calif.
EMPIRICAL COMPARISON OF BINARY AND CONTINUOUS PROXIMITY MEASURES FOR CLUSTERING OCCUPATIONAL TASK DATA Final Report, 1 Oct. 1980 - 1 Aug. 1981
John J. Pass and Robert E. Chatfield Mar. 1982 24 p refs
(ZF00001042)
(AD-A112930; NPRDC-TR-82-36) Avail: NTIS HC A02/MF A01 CSCL 05/9

Thirteen binary and three continuous proximity measures were used to cluster-analyze job incumbent profiles of task inventory data. The results were compared: (1) to recommend a binary measure for programming into CODAP System 80, a software package used extensively by the military and many other organizations, and (2) to determine to what extent binary measures can produce cluster solutions similar to solutions based on continuous measures. Sixteen 250-by-250 proximity matrices were derived from each of three Navy occupational samples, and the clustering procedure in CODAP was applied to selected matrices. Proximity matrix and cluster solution comparison revealed that: (1) there was high variability among binary measures, (2) the Jaccard and Dice measures were the most powerful binary measures, and (3) there was high similarity between the Jaccard and distance measures. The implications of the findings are discussed with reference to the proportion of zero scores in task inventory data. The Jaccard measure is recommended for clustering binary data for tasks and for programming into CODAP System 80. Author (GRA)

N82-29098# Katholieke Universiteit te Leuven (Belgium). Dept. Wiskunde.
COMPLETE STATISTICAL RANKING OF POPULATIONS, WITH TABLES AND APPLICATIONS
Jan Beirlant, Edward J. Dudewicz (Ohio State Univ., Columbus), and Edward C. vanderMeulen Dec. 1981 31 p refs
(Contract N00014-78-C-0543)
(AD-A114400; TR-145) Avail: NTIS HC A03/MF A01 CSCL 12/1

A new statistical methodology called ranking and selection theory is introduced. This document reviews procedures for completely ranking a set of populations (from best, second best, etc., down to worst), gives new tables needed to implement these procedures, and considers several practical examples using real data. GRA

N82-29099# Princeton Univ., N. J. Dept. of Statistics.
PRE-CONFIGURAL POLYSAMPLING PUSHBACK PERFORMANCE
Katherine Bell Krystinik Dec. 1981 46 p refs
(Contract DAAG29-79-C-0205)
(AD-A114304; TR-210-SER-2; ARO-16669.13-M) Avail: NTIS HC A03/MF A01 CSCL 12/1

The pushback estimates are defined by a preliminary data modification followed by the application of a robust statistic to the modified data. The form of the pushback estimate depends upon the choice of a scale estimate for the original data, a set of central values of order statistics, and a constant multiplier. Particular forms of the pushback estimates are both simple and perform rather well relative to a good estimate in the W-estimate or M-estimate category. Author (GRA)

N82-29100# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
BIAS REDUCTION Final Report, 1 Mar. 1975 - 31 Dec. 1981
William R. Schucany and Henry L. Gray 31 Dec. 1981 18 p refs
(Contract N00014-75-C-0439; NR Proj. 042-280)
(AD-A114254) Avail: NTIS HC A02/MF A01 CSCL 12/1

Significant activities in the investigation of the bias expansion principle and other topics in nonparametric analysis are summarized. The jackknife statistic, time series analysis, rank tests, goodness of fit, and minimum distance estimation are addressed. M.G.

N82-29101# Texas Univ., Austin. Center for Cybernetic Studies.
KHINCIN-KULLBACK-LEIBLER ESTIMATION WITH INEQUALITY CONSTRAINTS
A. Charnes, W. W. Cooper, and J. Tyssedal (Bergen Univ., Norway) Nov. 1981 10 p refs
(Contract N00014-75-C-0569)
(AD-A114326; CCS-414) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this paper we extend our grasp of statistical theory, duality theory, and computational convenience to the general linear inequality situation in K square L (or minimum discrimination information) estimation by exhibiting it as the limit of a simple one parameter sequence of equality problems. Only the finite discrete distribution case is treated here. Author (GRA)

N82-29102# Naval Postgraduate School, Monterey, Calif.
FINITE BIRTH-AND-DEATH MODELS IN RANDOMLY CHANGING ENVIRONMENTS
D. P. Gaver, P. A. Jacobs, and G. Latouche Feb. 1982 46 p refs
(RR0140501)
(AD-A114188; NPS55-82-007) Avail: NTIS HC A03/MF A01 CSCL 12/2

This report provides computational methods for studying properties of birth-death processes whose transition rates (infinitesimal generator) varies in accordance with a random, 'environmental', process. In particular, the models may be used to represent the availability of redundant systems subject to external shocks or other 'common cause' failures. These models also represent search for an object when the search environment (e.g. weather) varies randomly in time. Author (GRA)

N82-29103# Technische Universitaet, Brunswick (West Germany). Inst. fuer Angewandte Mathematik.
CLASSIFICATION OF DATA SETS
G.-H. Lietke, L. Schueler, C. Weber, and H. Wolff Bonn Bundesministerium der Vertiedigung 1980 111 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium

der Verteidigung
(BMVg-FBWT-80-17) Avail: NTIS HC A06/MF A01; DOK-ZENTBw, Bonn DM 40

Linear methods for the reduction of dimensionality of feature space (principal components and linear discriminant analysis) are discussed, leading up to more sophisticated nonlinear methods. A classification procedure based on quadratic discriminant functions is given. Nonlinear reduction methods are treated and details of the Koontz-Fukunaga algorithm are dealt with. All classification procedures are applied to real data (acoustic engine monitoring). Results are related to fuzzy classification due to the subjective nature of the samples. Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N82-29104# Polytechnic Inst. of New York, Brooklyn. Dept. of Electrical Engineering and Computer science.
THE 10TH IFIP CONFERENCE ON SYSTEM MODELING AND OPTIMIZATION Final Report, 31 Aug. - 4 Sep. 1981
R. F. Drenick and F. Kozin 15 Jan. 1982 254 p refs Conf. held in New York, 31 Aug. 4 Sep. 1981
(Grant AF-AFOSR-0008-80; AF Proj. 2304)
(AD-A113126; AFOSR-82-0244TR) Avail: NTIS HC A12/MF A01 CSCL 12/2

Abstracts of the contributed papers are grouped in these subject areas: control theory, games, identification and estimation, control applications, optimum control theory differential equations, stochastic control, programming theory, multiobjective optimization, programming algorithms, programming applications, combinatorial programming, computational complexity, socioeconomic models, mathematical economics, biological models, computer-aided design, systems problems, power systems, transportation problems, simulation studies, and management science. GRA

N82-29105# Texas Univ., Austin. Center for Cybernetic Studies.
HANDLING ARTIFICIAL VARIABLES IN A SIMPLEX METHOD. A COMMENTARY
A. Charnes and W. W. Cooper Nov. 1981 5 p refs
(Contract N00014-75-C-0569)
(AD-A114133; CCS-415) Avail: NTIS HC A02/MF A01 CSCL 12/2

Charnes' non-Archimedean simplex method and its computation in terms of Archimedean quantities is developed to correct erroneous statements in the research literature centering around methods of computation involving artificial variables. GRA

N82-29106# Stanford Univ., Calif. Systems Optimization Lab.
PILOT-1980 ENERGY-ECONOMIC MODEL. VOLUME 1: MODEL DESCRIPTION Interim Report
G. B. Dantzig, B. Avi-Itzhak, and T. J. Connolly Nov. 1981 322 p refs Sponsored by EPRI
(EPRI Proj. 652-1)
(DE82-901280; EPRI-EA-2090-Vol-1) Avail: NTIS HC A14/MF A01

PILOT-1980 is a US national energy-economic model that can be used to assess the impact of energy policy decisions and resource availability estimates over the next 40 to 10 years. PILOT's dynamic linear programming formulation allows a full look-ahead capability in a model integrating detailed energy sectors, the general economy, and foreign trade. A utility function measuring consumer's welfare captures price and income substitution effects. The model consists of a detailed description of energy technologies for extraction and conversion of energy resources, linked to a less detailed input-output model of the genera economy. An Industrial Energy Services Module uses engineering process-type representations to model demand substitutions in industry, implicitly changing the input-output coefficients. A similar Consumers Energy Services Module gives process-type modeling of demand substitutions in the private sector. The consumers utility function, PILOT's objective function, models price- and income-induced shifts in final demand patterns. DOE

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N82-29107# Maryland Univ., Baltimore. Dept. of Mathematics.
DETECTION, ESTIMATION, AND CONTROL ON GROUP MANIFOLDS Final Report, 1 Aug. 1980 - 31 Aug. 1981
James T. Lo 15 Oct. 1981 6 p
(Grant AF-AFOSR-0241-80; AF Proj. 2304)
(AD-A113019; AFOSR-82-0267TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

This final report covers work carried out by the principal investigator and a graduate research assistant at the Department of Mathematics during the 13 months period from 1 August 1980 to 31 August 1981, under the Grant AFOSR-80-0241. The progress has resulted in six technical papers listed within. Author (GRA)

N82-29108# Ballistic Research Labs., Aberdeen Proving Ground, Md.
ASCENDING AND ASYMPTOTIC SERIES FOR SQUARES, PRODUCTS AND CROSS-PRODUCTS OF MODIFIED BESSEL FUNCTIONS
A. S. Elder, K. L. Zimmerman, and E. M. Wineholt Feb. 1982 93 p refs
(DA Proj. 1L1-62618-AH-80)
(AD-A113307; AD-F300012; ARBRL-TR-02391) Avail: NTIS HC A05/MF A01 CSCL 12/1

Asymptotic series for squares and products of modified Bessel functions were programmed as well as the ascending and asymptotic series for the cross products. These programs reduced round off error and led to precise calculation of stresses in thin-walled cylinder according to the equations of elasticity. GRA

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N82-29109# General Electric Co., Schenectady, N. Y. Properties Branch.
INVESTIGATION FOR LOW-COST PERMANENT MAGNETS Annual Report, 1 Jul. 1980 - 30 Jun. 1981
J. J. Becker Sep. 1981 48 p refs
(Contract N00014-80-C-0566)
(AD-A107392; SRD-81-076) Avail: NTIS HC A03/MF A01 CSCL 20/3

The crystallization of initially amorphous rapidly quenched alloys may provide new materials with good permanent magnet properties at low cost. Preliminary investigations indicate that phosphorus and carbon are favorable alloying elements, and that sudden changes in properties may occur as the identities of the crystallizing phases change. the exploration of alloy systems has been greatly speeded up by the use of current-pulse annealing. It has been found that remanence ratios may be quite high even though the orientation of the crystals formed is probably random. The course of crystallization has been followed by resistance monitoring in conjunction with current-pulse annealing. X-ray diffraction indicates that the highest coercive forces are attained in only partially crystallized samples. Magnetic domain structures have been studied in crystallized ribbons and also in bulk samples of some of the phases observed in them, using both Kerr effect and magnetic colloid. These studies have given useful information about the nature and the magnitude of the magnetocrystalline anisotropy in the phases formed. Alloys containing rare earth elements appear very promising and are being actively pursued. Author (GRA)

N82-29110# Institute of Nuclear Physics, Krakow (Poland).
NONRELATIVISTIC GAUGE THEORIES
E. Kapuscik 1980 15 p refs
(DE81-700397; INP-1084/PL) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

An approach to nonrelativistic gauge theories is presented. The theory admits non-trivial field equations. In contradistinction to the relativistic case, the gauge fields in general are massive fields. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation.

For noise pollution see *45 Environment Pollution*.

N82-29111*# Stanford Univ., Calif. Joint Inst. for Aeronautics and Acoustics.
THE EFFECT OF BARRIERS ON WAVE PROPAGATION PHENOMENA: WITH APPLICATION FOR AIRCRAFT NOISE SHIELDING
C. V. M. Mgana and I-Dee Chang May 1982 142 p refs
(Contract NCC2-76)
(NASA-CR-169128; NAS 1.26:169128) Avail: NTIS HC A07/MF A01 CSCL 20A

The frequency spectrum was divided into high and low frequency regimes and two separate methods were developed and applied to account for physical factors associated with flight conditions. For long wave propagation, the acoustic filed due to a point source near a solid obstacle was treated in terms of an inner region which where the fluid motion is essentially incompressible, and an outer region which is a linear acoustic field generated by hydrodynamic disturbances in the inner region. This method was applied to a case of a finite slotted plate modelled to represent a wing extended flap for both stationary and moving media. Ray acoustics, the Kirchhoff integral formulation, and the stationary phase approximation were combined to study short wave length propagation in many limiting cases as well as in the case of a semi-infinite plate in a uniform flow velocity with a point source above the plate and embedded in a different flow velocity to simulate an engine exhaust jet stream surrounding the source. A.R.H.

N82-29112*# National Aeronautics and Space Administration. Pasadena Office, Calif.
ACOUSTIC PARTICLE SEPARATION Patent Application
Martin B. Barmatz (JPL), James D. Stoneburner (JPL), Nathan Jacobi (JPL), and Taylor Wang, inventors (to NASA) (JPL) Filed 19 May 1982 17 p
(Contract NAS7-100)
(NASA-Case-NPO-15559-1; US-Patent-Appl-SN-379601) Avail: NTIS HC A02/MF A01 CSCL 20A

A method for separating particles according to a particular property such as size, density, shape, or magnetic or electrostatic properties is described. The particles are passed through a chamber while resonant acoustic energy is applied along a chamber dimension such as its height H. The acoustic standing wave pattern urges particles toward the center of an acoustic well of the pattern, such as the center of the chamber height at 36. At the same time a nonacoustic force such as gravity urges the particles away from the center of the well. Particles are distributed within a levitation region according to a particle property. For example, with particles of the same material but different size, large particles lie in an area near the bottom of the levitation region, while the smallest particles lie in an area near the top of the levitation region. NASA

N82-29113# Yale Univ., New Haven, Conn. Dept. of Engineering and Applied Science.
PROPERTIES OF MATERIALS USING ACOUSTIC WAVES Summary Report, 1 Nov. 1975 - 1 May 1982
Robert E. Apfel May 1982 22 p refs
(Contract N00014-76-C-0527)
(AD-A114124) Avail: NTIS HC A02/MF A01 CSCL 20/1

Our research efforts can be classified into four broad categories; Applications of acoustic levitation; nonlinear acoustics and radiation pressure; acoustic cavitation; and the development of a facility for the characterization of small samples. Although these classifications are somewhat arbitrary, with major overlaps existing among different categories, they do allow us to discuss the major thrusts of our work. When the acoustic radiation stress on an object produces a force that balances the gravitational force on it, the object will be levitated. One can either use levitation to characterize the sample mechanically, in a manner analogous to Millikin's characterization of the electric charge on an oil drop, or one can merely use the levitation as a tool for manipulating the sample. Our results have shown a new anomaly for liquid water: a turning point in the sound velocity at approximately -33 C. These are the first of only a few bits of data that argue against the more popular speculation that water is approaching (but never reaching) a critical type of behavior at around -45 C. GRA

N82-29114# National Bureau of Standards, Washington, D.C.
FUNDAMENTAL DEVELOPMENTS FOR QUANTITATIVE ACOUSTIC EMISSION MEASUREMENTS Interim Report
F. R. Breckenridge, D. G. Eitzen, R. B. Clough, E. R. Fuller, N. N. Hsu, and J. A. Simmons Oct. 1981 155 p refs
(EPRI Proj. 608-1)
(DE82-901315; EPRI-NP-2089) Avail: NTIS HC A08/MF A01

Work under Phase 1 of the EPRI/NBS AE program focused on: (1) test standardization through the development of a calibration capability for AE sensors; (2) sensor concepts and techniques for field and laboratory calibration ; (3) basis for understanding and predicting AE behavior through the development of a mathematical framework for AE (transfer function formalism) through specific theoretical solutions to AE generation, transmission and inversion problems and the successful application of these theories to actual events in glass; (4) basis for assessing defect significance through the development of improved signal processing and inversion methods and through experimental results from AE in pressure vessel steels; and (5) the implementation of experiments to establish the feasibility of using causal methods, based on theoretical mechanics, to obtain source information in structural steels. DOE

N82-29115# Technische Physische Dienst TNO-TH, Delft (Netherlands).
PRELIMINARY STUDY OF THE POSSIBILITIES FOR THE USE OF GLASS FIBERS IN HYDROPHONES [VOORSTUDIE VAN DE MOGELIJKHEDEN VOOR DE TOEPASSING VAN GLASVEZELS IN HYDROFOONS]
P. vanZuylen and H. J. Raterink 24 Aug. 1981 68 p refs In DUTCH
(Contract A81/KM/078)
(TPD-1981-0-2(105,106); TDCK-75535) Avail: NTIS HC A04/MF A01

Different types of hydrophones in which glass fibers were used were compared. For hydrophones in which the glass fibers are used in an interferometric setup, sensitivities comparable with those of a piezoelectric hydrophone are obtained. A simpler design, the lattice hydrophone, can be used in cases without extreme sensitivity and bandwidth requirements. Contrary to a piezoelectric hydrophone, a glass fiber hydrophone is not sensitive to electromagnetic interference and is, in some cases, appreciably smaller and lighter. Author (ESA)

N82-29116# Technische Physische Dienst TNO-TH, Delft (Netherlands).
USE OF THE CAVITATION TUNNEL AT THE DUTCH NAVAL EXPERIMENT STATION (NSP), WAGENINGEN FOR THE DETERMINATION OF THE ACOUSTIC SOURCE STRENGTH OF PROPELLER CAVITATION [HET GEBRUIK VAN DE CAVITATIETUNNEL VAN HET NSP TE WAGENINGEN VOOR DE BEPALING VAN DE AKOESTISCHE BRONSTERKTE VAN SCHROEFCAVITATIE]
K. Verhulst 18 Aug. 1981 44 p refs In DUTCH
(Contract A72/KM/007)
(TPD-908-720; TDCK-75536) Avail: NTIS HC A03/MF A01

Experiments were performed, using a five blade model propeller, in order to investigate the possibilities of using the large NSP cavitation tunnel in the acoustical study of propeller cavitation. The influence of the hydrodynamic characteristics in

the tunnel on the sound transmission to the tunnel wall was investigated. The transfer functions fluctuate strongly, even at a given water velocity or static pressure, probably due to poor acoustic damping in the tunnel circuit. For a turning propeller, the acoustic response of the tunnel wall due to propeller cavitation is very stable, since the degree of turbulence in the water, and thus the absorption, are very high. Author (ESA)

N82-29117# Technische Physische Dienst TNO-TH, Delft (Netherlands).
MEASUREMENT OF SOUND POWER FLOW IN BENDING WAVES ALONG PIPES. PART 2: INFLUENCE OF A NEAR FIELD ON MEASUREMENTS WITH TWO ACCELEROMETERS [METING VAN DE GELUIDVERMOGENSSTROOM DOOR BUIGGOLVEN LANGS PIJPLEIDINGEN. DEEL 2: INVLOED VAN EEN NABIJHEIDSVELD OP METINGEN MET DE TWEE-OPNEMERSMETHODE]
J. W. Verheij 30 May 1980 37 p refs in DUTCH; ENGLISH summary
(Contract A76/KM/030)
(TPD-008-785/1; TDCK-75134) Avail: NTIS HC A03/MF A01

A feasibility study on the application of power flow measurements for sound transmission identification and quantification on pipe system is presented. For measuring the power flow in bending waves along a pipe in general, four lateral accelerations at slightly separated positions are needed. However, at sufficient distance of supports or discontinuities, bending wave near fields are negligible. In that case, a much simpler two-accelerometers method may be used. An error analysis for the two-accelerometers method in case of near fields is presented. Calculations are given for the minimum distance that is to be observed to keep the error within prescribed limits. Such a method might be applied on machinery installations in ships to determine the relative strength of sound transmission via pipes. Author (ESA)

N82-29118# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
SOME COMMENTS ON THE PREDICTION OF FORWARD FLIGHT EFFECTS ON JET NOISE
Frank Obermeier Dec. 1981 37 p refs
(MPIS-20/1981; ISSN-0436-1199) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 8.55

How aeroacoustic sound generation in turbulent jet flow is affected by a coflowing stream is considered. Experiment shows that simply allowing for Doppler effects, applied to the sound field of a static jet which is assumed to be known, does not yield convincing results. The effects of a coaxial stream on the aerodynamics of jet flow, i.e., the effects on its characteristic length and velocity, found experimentally, are critically reviewed through the literature. Results lead to a prediction scheme for in-flight effects on jet noise. A comparison of this method with test data exhibits good agreement. Author (ESA)

N82-29119# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
CALCULATION PROCEDURE FOR SOUND PROPAGATION IN A MULTISECTIONAL DUCT WITH UNIFORM FLOW
J. N. Laan 8 Nov. 1979 24 p refs
(Contract NIVR-1773)
(NLR-TR-79111-U) Avail: NTIS HC A02/MF A01

A set of equations for the sound propagation in an axisymmetric multisectional duct is presented. For each side of a source section, the combined duct effects of transmission, reflection, and absorption are reduced to one matrix of coefficients. The procedure is compatible with a source description which takes the feedback of the sound field into account, as well as with far field directivity calculations from hard walled ducts. A source strength distribution is needed to solve the complete set of equations. Annular sections can be dealt with if they contain the same uniform mean flow over the duct cross section as the circular sections. Author (ESA)

N82-29120# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
CALCULATION OF SOUND SUPPRESSION IN A CIRCULAR THREE-SECTIONED UNIFORM FLOW DUCT
J. N. Laan 2 Feb. 1981 30 p refs
(Contract NIVR-1773)
(NLR-TR-81002-U) Avail: NTIS HC A03/MF A01

Pure tone sound suppression in a cylindrical duct of finite length with uniform flow, containing an intermediate section with sound absorbing walls, was analyzed, using a method based on mode matching, as an aid to designing acoustic liners for civil aircraft turbofan engines. It is shown that variations in sound suppression effected by a varying source distribution with linear properties fixed, dominate variations obtained by a varying liner impedance with source distribution fixed. The least attenuated mode approximation differs considerably from the actual sound suppression and its increment with length increase. Sound suppression in a modal description results from modal attenuation, redistribution of modes (transmission and reflection) and interaction of nonorthogonal modes. Author (ESA)

N82-29121# Bolt, Beranek, and Newman, Inc., Canoga Park, Calif.
INDUSTRIAL MACHINERY NOISE IMPACT MODELING, VOLUME 1
C. H. Hansen and B. A. Kugler Jul. 1981 191 p refs 2 Vol.
(Contract EPA-68-01-5892)
(PB82-148099; BBN-4535-Vol-1) Avail: NTIS HC A09/MF A01 CSCL 13H

The development of a machinery noise computer model which may be used to assess the effect of occupational noise on the health and welfare of industrial workers is discussed. The purpose of the model is to provide EPA with the methodology to evaluate the personnel noise problem, to identify the equipment types responsible for the exposure and to assess the potential benefits of a given noise control action. Due to its flexibility in design and application, the model and supportive computer program can be used by other federal agencies, state governments, labor and industry as an aid in the development of noise abatement programs. Author (GRA)

N82-29122# Bolt, Beranek, and Newman, Inc., Canoga Park, Calif.
INDUSTRIAL MACHINERY NOISE IMPACT MODELLING. VOLUME 2: APPENDICES
B. A. Kugler and C. H. Hansen May 1981 513 p 2 Vol.
(Contract EPA-68-01-5892)
(PB82-148107; BBN-4535-Vol-2) Avail: NTIS HC A22/MF A01 CSCL 13H

The computer program developed to ascertain noise levels to which workers in foundries and sawmills are exposed is given. Output data from computer input are delineated. Author(GRA)

N82-29123# Naval Postgraduate School, Monterey, Calif.
VARIABILITY AND SENSITIVITY OF COUPLED MIXED LAYER ACOUSTIC MODEL SYSTEMS M.S. Thesis
Rory H. Fisher Mar. 1981 124 p refs
(AD-A114302; NPS68-81-002) Avail: NTIS HC A06/MF A01 CSCL 17/1

This study is the first reported analysis of coupled mixed layer-acoustic model systems. This analysis emphasizes the performance of the combined systems rather than the acoustic or ocean models separately. Acoustic variability of the coupled model systems was studied in terms of the median detection range (MDR). Synoptic time variations of MDR as a function of figure of merit, frequency and receiver depth were analyzed during the month of May 1980 at OWS 'Papa' in order to provide a better insight into the operational capabilities of model systems to accurately represent the actual oceanic variability. The results of this limited analysis revealed that the model systems displayed more day-to-day acoustic (MDR) variability than did direct environmental input(BT). The capability to accuratley model the thermal structure was reviewed with the following results. No significant correlation was observed betwen the EOTS model and the actual BT mixed layer depths while there appeared to be a strong positive correlation between the ODT model (driven by atmospheric forcing) and the BT mixed layer depths. Moreover, a possible lag of two days was observed in the EOTS model mixed layer depth relative to the observed mixed layer depth time series. GRA

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N82-29124# Westinghouse Research and Development Center, Pittsburgh, Pa.
CHARGED PARTICLE SIMULATION OF FAST NEUTRON DAMAGE Final Report, 1 Jan. 1976 - 31 Oct. 1981
W. J. Choyke, J. A. Spitznagel, and R. M. More (California Univ., Lawrence Livermore Lab.) 22 Oct. 1981 69 p refs
(Contract N00014-76-C-0482)
(AD-A107394; Rept-81-9F3-SIMFN-R1) Avail: NTIS HC A04/MF A01 CSCL 20/8

The motivation of this work is to compare atomic damage configurations associated with neutron and fast-ion damage. The question we set out to answer was: Which choice of ion mass and kinetic energy provides the best simulation of fast neutron damage? The answer which emerges is that the primary damage state, i.e. the statistical distribution of free defects, and subcascade regions before annealing, is remarkably independent of the ion species and its PKA spectrum. Experimentally single crystals of Mo were bombarded with 86Kr, 20Ne, 11B, 4He, and 1H in such a manner that the energy deposited into elastic collisions (displacement events) in the near surface region was approximately equal for each implant. The ion fluences spanned more than two orders of magnitude, and the resulting damage level at each fluence was monitored by obtaining aligned backscattered (channeling) spectra in a $<111>$ axial direction. As an additional check on the channeling results selected implants were also examined with TEM. The channeling experiments clearly show that the final damage state, at all fluences, for 86Kr and 20Ne is the same. At low fluences, the final damage state for 86Kr, 20Ne, 11B, and 4He appears to be the same, but for high fluences there are unresolved difficulties with the 11B and 4He channeling results. GRA

N82-29125# Science Applications, Inc., Atlanta, Ga.
ANALYSIS OF A RAIL GUN PLASMA ACCELERATOR Final Report
Jad H. Batteh Apr. 1982 55 p refs
(Contract DAAK11-80-C-0102; DA Proj. 1L1-62603-AH-18)
(AD-A114043; AD-F300023; ARBRL-CR-00478) Avail: NTIS HC A04/MF A01 CSCL 19/6

A model is developed to study the characteristics of an arc-driven rail gun. In particular, a system of equations is developed which provides a computationally efficient method for estimating the arc-projectile acceleration and the average thermodynamic properties of the arc. Predictions of the model are compared with experimental measurements and with the results of other investigations. The model is used to determine the range of plasma conditions which can be achieved through variations of the arc mass, projectile mass and current. The possibility of using the rail gun as a plasma accelerator is discussed with particular emphasis on the range limitations imposed by plasma expansion. GRA

N82-29126# New York Univ., N. Y. Dept. of Chemistry.
CHARGE TRANSFER SPECTRA AND PHOTOELECTRON EMISSION BY SOLUTIONS
Paul Delahay Apr. 1982 22 p refs
(Contract N00014-75-C-0397; NR Proj. 051-258)
(AD-A114054; TR-19) Avail: NTIS HC A02/MF A01 CSCL 20/8

Charge transfer absorption spectra are correlated to the energetics of photoelectron emission by donor and/or acceptor solutions. Donor-acceptor pairs include: 10 inorganic anions and solvent (water); five cations (V(2+) to Co(2+)) and solvent; solvent and atoms (H, Cl, Br, I), OH radical, Fe(3+), Ce(4+); anion-cation pairs exhibiting charge transfer in the 7 to 10 eV range. GRA

N82-29127# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
THE INFLUENCE OF A BACKGROUND PLASMA ON THE DIOCOTRON INSTABILITY OF A RELATIVISTIC HOLLOW ELECTRON BEAM Final Report
Henry J. Bilow and Hans S. Uhm Sep. 1981 42 p refs
(AD-A113530; AD-F500005; NSWC/TR-81-393) Avail: NTIS HC A03/MF A01 CSCL 20/7

The influence of a background plasma on the diocotron instability of a relativistic hollow electron beam is investigated within the framework of a cold fluid model. The background plasma is taken to have a uniform density except at the mean radius of the electron beam where the density is assumed to be discontinuous. Of the charged species comprising the plasma, only the electrons influence the dynamics of the beam-plasma system; the effect of the ions is negligible because of their small plasma frequency. A dispersion relation for the eigenfrequencies of the system is derived and employed to examine instabilities. It is found that the fundamental mode, which is unconditionally stable for a hollow electron beam in a vacuum, is now unstable for certain parameter regimes. The appearance or growth of instabilities with increases in the plasma density discontinuity is observed, while increases in the relativistic factor are seen to exert a stabilizing influence. It is also found that thin beams are generally more unstable than thick ones. GRA

N82-29128# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
STABILITY OF CHARGED BEAM PROPAGATION THROUGH A RELATIVISTIC HOLLOW ELECTRON BEAM Final Report
Hans S. Uhm Sep. 1981 36 p refs
(AD-A113529; AD-F500004; NSWC/TR-81-391) Avail: NTIS HC A03/MF A01 CSCL 20/7

Stability properties of a charged beam propagation through a relativistic hollow electron beam are investigated, in connection with present experimental applications in the collective particle accelerator. The stability analysis is carried out for long axial wavelength and low-frequency perturbations. A closed algebraic dispersion relation for coupled transverse oscillations is obtained for the solid and hollow beams with sharp-boundary density profiles. One of the most important features in the analysis is that the typical growth rate of the transverse oscillation is order of the hollow beam diocotron frequency, thereby severely limiting the solid beam propagation through a relativistic hollow electron beam. However, for a solid beam with a small radius, the fundamental mode perturbation (i.e., the dipole oscillation) is the most unstable mode. GRA

N82-29129# Princeton Univ., N. J. Dept. of Chemistry.
STUDIES IN ENERGETIC MATERIAL DYNAMICS Annual Status Report, 1 Jun. 1981 - 30 May 1982
Herschel Rabitz May 1982 4 p
(Contract N00014-81-K-0689)
(AD-A114226; Rept-1) Avail: NTIS HC A02/MF A01 CSCL 07/3

This research is for the study of microscopic processes relevant to the decomposition of energetic materials. The research has three components: critical parameter studies in bulk systems, intramolecular energy transfer in polyatomic molecules, and the application of new material tools to decomposition kinetics. Author (GRA)

N82-29130# Wisconsin Univ., Madison. Dept. of Physics.
MOLECULAR REACTION RATES Final Report, 15 Dec. 1978 - 26 Jan. 1982
Chun C. Lin and Sunggi Chung 24 Feb. 1982 70 p refs
(Contract F19628-79-C-0045; AF Proj. 2310)
(AD-A114342; AFGL-TR-82-0062) Avail: NTIS HC A04/MF A01 CSCL 07/4

Theoretical excitation cross sections of N2 molecule by electron-impact are calculated by the close-coupling method. Excitation cross sections of H2 are calculated by a hybrid method of close-coupling and the R-Matrix method and by the close-coupling with polarized orbitals included. The transition probability of atomic oxygen ringlet S zero to ringlet D two (lambda = 5577A) is calculated by using multiconfiguration wave functions. Author (GRA)

N82-29131# McElroy (Ralph) Co., Austin, Tex.
INJECTION SPACE CHARGE: ENLARGEMENTS OF FLUX DENSITY FUNCTIONING POINT CHOICE
A. Ropert 1981 38 p refs Transl. into ENGLISH of "Charge

d'Espace a l'Injection: Grossissments d'Emittances Choix du Point de Fonctionnement" Rept. LNS-TH-006 Commissariat a l'Energie Atomique. Inst. National de Physique Nucleaire et des Particules, Lab. National Saturne (France), 1978 Prepared for Los Alamos National Lab.
(DE82-002299; LA-TR-81-31; LNS-TH-006) Avail: NTIS HC A03/MF A01

In Saturne, injection consists of a synchrobetatron filling of the chamber, with the goal of providing a beam with the following characteristics circulating in the machine: horizontal flux density 90 (LC OMEGA)mm mrd, vertical flux density 210 (LC OMEGA) mm mrd, dispersion in moments +- 7 x 10(+3), and number of particles 2 x 10(12). The determination of the principal injection parameters was made by means of GOC calculation programs. The goal of this study is to show a certain number of phenomena induced by the forces due to space charge and left suspended up to this point: variations in the intensity injectable into the machine extension of the beam occupation zone in the (MU)/sub x'/ (MU)/sub z/ diagram, and turn-turn interactions. The effects of the space charge lead to a deterioration of the injected beam for certain functioning points leading to the selection of a zone in the (MU)/sub x'/ (MU)/sub z/ diagram that is particularly suitable for beam injection. DOE

N82-29132# Los Alamos Scientific Lab., N. Mex.
THERMAL PROPERTIES OF METALLIC SODIUM NEAR MELT FROM MOLECULAR DYNAMICS CALCULATIONS
G. K. Straub, Richard E. Swanson, Brad L. Holian, and Duane C. Wallace 1981 26 p Presented at the CECAM Workshop on Ab-Initio Calculation of Phonon Spectra
(Contract W-7405-eng-36)
(DE81-030307; LA-UR-81-2407) Avail: NTIS HC A03/MF A01

Molecular dynamics simulations of the thermal properties of metallic sodium were performed in the high temperature anharmonic region near the melting point. The ion-ion interaction potential was derived from pseudopotential theory. From the molecular dynamics results, the anharmonic thermal energy was determined directly without the use of thermodynamic perturbation theory. Comparison of the calculated melting temperature, latent heat of fusion, fluid phase diffusion coefficient, and the atomic distribution function are all in good agreement with experiment. DOE

N82-29133# Los Alamos Scientific Lab., N. Mex.
SATURN 2: JOINT PROJECT OF THE CEA AND THE IN2P3: DETECTION MEASUREMENT ELECTRODE
A. Nakach 1981 7 p Transl. into ENGLISH of "Saturne 2 - Entreprise Commune du CEA et de l'IN2P3: Electrode de Detection et Mesure" Internal report Commissariat a l'Energie Atomique, Inst. National de Physique Nucleaire et des Particules, Lab. National Saturne (France) Prepared for Los Alamos National Lab.
(Contract W-7405-eng-36)
(DE82-003204; LA-TR-81-37) Avail: NTIS HC A02/MF A01

Capacitive monitors to determine the beam axis position at Saturn II are described. Performance data are given. DOE

N82-29134# California Univ., Berkeley. Lawrence Berkeley Lab. Material and Molecular Research Div.
NMR STUDIES OF ORIENTED MOLECULES Ph.D. Thesis
Steven Williams Sinton Nov. 1981 372 p refs
(Contract W-7405-eng-48)
(DE82-005258; LBL-13604) Avail: NTIS HC A16/MF A01

Deuterium and proton magnetic resonance are used in experiments on a number of compounds which either form liquid crystal mesophases themselves or are dissolved in a liquid crystal solvent. Proton multiple quantum NMR is used to simplify complicated spectra. The theory of nonselective multiple quantum NMR is briefly reviewed. Benzene dissolved in a liquid crystal are used to demonstrate several outcomes of the theory. Experimental studies include proton and deuterium single quantum and proton multiple quantum spectra of several molecules which contain the hiphenyl moiety. 4-Cyano-4 prime-n-pentyl-d11-biphenyl (5CB-d11) is studied as a pure compound in the nematic phase. The obtained chain order parameters and dipolar couplings agree closely with previous results. Models for the effective symmetry of the biphenyl group in 5CB-d11 are tested against the experimental spectra. The dihedral angle, defined by the planes containing the rings of the biphenyl group, is found to be 30 + or - 20 for 5DB-d11. Experiments are also described for 4,4 prime-d2-biphenyl, 4,4 prime-dibromo-biphenyl, and unsubstituted biphenyl. DOE

N82-29135# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
EFFECT OF VIBRATIONAL EXCITATION ON THE DYNAMICS OF ION MOLECULE REACTIONS Ph.D. Thesis
Scott Law Anderson Nov. 1981 131 p refs
(Contract W-7405-eng-48)
(DE82-004951; LBL-13309) Avail: NTIS HC A07/MF A01

A technique of vibrational effects on ion molecule reaction cross sections is described. Vibrational and collision energy dependent cross sections are presented for proton and H atom transfer, charge transfer and collision induced dissociation reactions in various isotopic H2() + H2 systems. All the reactions are highly influenced by avoided crossings between the ground and first excited potential energy surfaces. Charge transfer between reagents as they approach each other, transition to and in some cases reactions on excited potential energy surfaces, competition between different channels, and strong coupling of proton and charge transfer channels which occurs only for two of the systems studied (H2() + Ar, N2) are discussed. Oscillatory structure in the collision energy dependence of the endoergic H2() (v = 0) + Ar charge transfer reaction for the first time is , and a simple model which is commonly used for atom-atom charge transfer is used to fit the peaks. A simple model is used to assess the importance of energy resonance and Franck-Condon effects on molecular charge transfer. DOE

N82-29136# McElroy (Ralph) Co., Austin, Tex.
COMPTON EFFECT IN THE SPS: ITS APPLICATION IN BEAM PROFILE MEASUREMENT
J. Bosser and F. Meot 1981 17 p refs Transl. into ENGLISH of "Effect Compton au SPS: Application a la Mesure du profil du Faisceau" rept. CERN/SPS/80-17 Organisation Europeene pour la Recherche Nucleaire, Geneva, Dec. 1980 Prepared for LASL
(Contract W-7405-eng-36)
(DE82-002534; LA-TR-81-30; CERN/SPS/80-17) Avail: NTIS HC A02/MF A01

The Compton effect between a laser beam and relativistic particles causes photon scattering, exhibiting spectra characteristics related to the relativistic aspect of the interaction. This interaction is studied in the context of the SPS synchrotron, and its application in determining the profile of the proton beam, as well as possible development in the context of the LEP injector, are discussed. DOE

N82-29137# Pacific Northwest Lab., Richland, Wash.
IMPACT OF A PROPOSED CHANGE IN THE MAXIMUM PERMISSIBLE DOSE LIMIT FOR NEUTRONS TO RADIATION-PROTECTION PROGRAMS AT DOE FACILITIES
B. L. Murphy Sep. 1981 39 p refs
(Contract DE-AC06-76RL-01830)
(DE82-001419; PNL-3973) Avail: NTIS HC A03/MF A01

The National Council on Radiation Protection and Measurements (NCRP) has issued a statement advising that it is considering lowering the maximum permissible dose for neutrons. This action would present substantive problems to radiation protection programs at DOE facilities where a potential for neutron exposure exists. In addition to altering administrative controls, a lowering of the maximum permissible dose for neutrons will require advances in personnel neutron dosimetry systems and neutron detection and measurement instrumentation. Improvement in the characterization of neutron fields and spectra at work locations will also be needed. DOE has initiated research and development programs in these areas. However, problems related to the control of personnel neutron exposure have yet to be resolved and investigators are encouraged to continue collaboration with both United States and international authorities. DOE

N82-29138# Battelle Pacific Northwest Labs., Richland, Wash.
RADON DIFFUSION THROUGH MULTILAYER EARTHEN COVERS: MODELS AND SIMULATIONS
D. W. Mayer, C. A. Oster, R. W. Nelson, and G. W. Gee Sep.

1981 67 p refs
(Contract DE-AC06-76RL-01830)
(DE82-001420; PNL-3989) Avail: NTIS HC A04/MF A01

A capability to model and analyze the fundamental interactions that influence the diffusion of radon gas through uranium mill tailings and cover systems were investigated. The theoretical basis for modeling radon diffusion and an understanding of the fundamental interactions that influence radon diffusion were developed. The theory was incorporated into three computer models that are used to analyze several tailings and cover configurations. The theoretical basis for modeling radon diffusion and the computer models used to analyze uranium mill tailings and multilayered cover systems are discussed. DOE

N82-29139# California Univ., Livermore. Lawrence Livermore Lab.
TABLES AND GRAPHS OF PHOTON-INTERACTION CROSS SECTIONS FROM 0.1 KEV TO 100 MeV DERIVED FROM THE LLL EVALUATED-NUCLEAR-DATA LIBRARY
E. F. Plechaty, D. E. Cullen, and R. J. Howerton 11 Nov. 1981 537 p
(Contract W-7405-eng-48)
(DE82-004819; UCRL-50400-Vol-6-Rev-3) Avail: NTIS HC A23/MF A01

Energy dependent evaluated photon interaction cross sections and related parameters are presented for elements H through Cf(Z = 1 to 98). Data are given over the energy range from 0.1 keV to 100 MeV. The related parameters include form factors and average energy deposits per collision (with and without fluorescence). Fluorescence information is given for all atomic shells that can emit a photon with a kinetic energy of 0.1 de V or more. In addition, the following macroscopic properties are given: total mean free path and energy deposit per centimeter. This information is derived from the Livermore Evaluated-Nuclear-data Library (ENDL) AS OF October 1978. DOE

N82-29140# Ohio State Univ., Columbus.
LIFETIMES AND PRODUCTION PROPERTIES OF CHARMED PARTICLES
N. R. Stanton 1981 11 p refs Sponsored in part by the Canadian N.S.E.R.C., the Japanese Ministry of Education, and the Korean Science Foundation
(Contract DE-AC02-76ER-01545)
(DE82-005302; DOE/ER-01545/317) Avail: NTIS HC A02/MF A01

Results from a hybrid experiment in a neutrino beam are presented, including a new limit on muon neutrino to tau neutrino oscillations, lifetime measurements for four species of charmed particles, and a candidate for associated production of a charmed pair. DOE

N82-29141# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
MESON PRODUCTION IN RELATIVISTIC-HEAVY-ION COLLISIONS Ph.D. Thesis
Stephen R. Schnetzer Aug. 1981 132 p refs
(Contract W-7405-eng-48)
(DE82-005652; LBL-13727) Avail: NTIS HC A07/MF A01

The inclusive kappa(+) production cross sections were measured at angles from 15 to 80 deg in collisions of protons (2.1 GeV) and deuterons (2.1 GeV/amu) on NaF and Pb, and Ne (2.1 GeV/amu) on C, NaF, KCl, Cu, and Pb. The magnetic spectrometer, and by detecting the particles from the kaon decays in a Pb glass Cerenkov counter. The momentum range of the detected kaons extended from 350 MeV/c to 750 MeV/c. The multiplicity of each event was measured by a set of scintillation counter telescopes which were situated around the target. The differential cross section of the kaons falls off exponentially with center of mass energy in the nucleon nucleon center of mass frame. In addition, the angular distribution of the kaons is nearly isotropic in this frame even for p(-1) NaF and Ne(-1) Pb collisions. The data are compared with a row on row model and a thermal model. Neither are able to explain all features of the data. The row on row model does not reproduce the near isotropy in the nucleon nucleon frame, and the thermal model overpredicts the kaon yield by a factor of approximately twenty. DOE

N82-29142# Los Alamos Scientific Lab., N. Mex.
PHOTONEUTRON GENERATION WITH ELECTRON UNDULATORS
G. C. Baldwin Dec. 1981 21 p refs
(Contract W-7405-eng-36)
(DE82-007034; LA-9051) Avail: NTIS HC A02/MF A01

An extremely compact line geometry pulsed source of photoneutrons is proposed with controllable energies of only a few kiloelectron volts, average yields exceeding 1(13) per second, peak intensities higher than the average by two or three orders of magnitude, controllable polarization, and pulse durations of about 2 ns. This source uses photons from a magnetic undulator in a 30 GeV electron storage ring. Parameters of the undulator and storage ring are stringent but probably attainable with careful design and construction. Several applications are discussed. DOE

N82-29143# New York Univ., N. Y. Dept. of Physics.
STUDY OF PHOTOEXCITED STATES BY POSITRON METHOD Final Report
1981 4 p refs
(Contract DE-AS02-77EV-04500)
(DE82-005469; DOE/EV-04500/2) Avail: NTIS HC A02/MF A01

In most insulators, positrons can capture an electron into a stable atomic state before annihilation called positronium (Ps). Positronium, when formed, is a partcularly powerful probe of materials since Ps annihilates in distinct ways from free positrons. It also has two different spin states which can be perturbed by paramagnetic centers in the medium and, thereby, measure their concentration and properties. This aspect of low energy positron physics was taken advantage of for the study of light excited electronic states in organic molecules. Long lived triplet states, which normally yield phosphorescent luminescence on deexcitation, are particularly interesting. The triplet state has long been the subject of speculation as to its role in biology, the transmission of information, distribution of photo and radiation effects, etc. It was the object of this project to assess the potential of the positron method for the detection of trace concentrations of photo induced triplet states of organic molecules. Progress is discussed. A.R.H.

N82-29144# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
STUDY OF CORRELATIONS IN MOLECULAR MOTION BY MULTIPLE QUANTUM NMR Ph.D. Thesis
Jau-Huei Tang Nov. 1981 290 p refs
(Contract W-7405-eng-48)
(DE82-005650; LBL-13605) Avail: NTIS HC A13/MF A01

The theoretical background of spin Hamiltonians, the density matrix formalism of multiple quantum NMR are discussed as well as creation and detection of multiple quantum coherence by multiple pulse sequence. Prototype multiple quantum spectra of oriented benzene are presented. Redfield relaxation theory and the application of multiple quantum NMR to the study of correlations in fluctuations are considered. An oriented methyl group relaxed by paramagnetic impurities is examined and possible correlated motion between two coupled methyl groups is investigated by multiple quantum NMR. For a six spin system it is shown that the four quantum spectrum is sensitive to two body correlations, and serves a ready test of correlated motion. The spin lattice dynamics of orienting or tunneling methyl groups (CH3 and CD3) at low temperatures and the anisotropic spin lattice relaxation of deuterated hexamethylbenzene, caused by the sixfold reorientation of the molecules are described as well as NMR spectrometers. DOE

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation*.

N82-29145# Geological Survey, Washington, D. C.
US GEOLOGICAL SURVEY RESEARCH IN RADIOACTIVE

WASTE DISPOSAL, FISCAL YEAR 1979
Robert Schneider, E. H. Roseboom, Jr., J. B. Robertson, and P. R. Stevens 1982 79 p refs
(USGS-CIRC-847) Avail: NTIS HC A05/MF A01

Geologic and hydrologic research related to the disposal of radioactive wastes is reported. The categories are described as they relate most directly to: (1) high level and transuranic wastes; (2) low level wastes; or (3) uranium mill tailings. The identification and geohydrologic characterization of waste disposal sites, investigations of specific sites where wastes have been stored, and regions or environments where waste disposal sites might be located are studied. Techniques and methods for characterizing disposal sites and studies of geologic and hydrologic processes related to the transport and (or) retention of waste radionuclides are presented. E.A.K.

N82-29146# RAND Corp., Santa Monica, Calif.
MONITORING TECHNOLOGIES FOR OCEAN DISPOSAL OF RADIOACTIVE WASTE
Mark B. Triplett, Kenneth A. Solomon, Charles B. Bishop, and Robert C. Tyce Jan. 1982 109 p refs
(Grant NA79AA-D-00121)
(RAND/R-2773-NOAA; ISBN-0-8330-370-4) Avail: NTIS HC A06/MF A01

The feasibility of using carefully selected subseabed locations to permanently isolate high level radioactive wastes at ocean depths greater than 4000 meters is discussed. Disposal at several candidate subseabed areas is being studied because of the long term geologic stability of the sediments, remoteness from human activity, and lack of useful natural resources. While the deep sea environment is remote, it also poses some significant challenges for the technology required to survey and monitor these sites, to identify and pinpoint container leakage should it occur, and to provide the environmental information and data base essential to determining the probable impacts of any such occurrence. Objectives and technical approaches to aid in the selective development of advanced technologies for the future monitoring of nuclear low level and high level waste disposal in the deep seabed are presented. Detailed recommendations for measurement and sampling technology development needed for deep seabed nuclear waste monitoring are also presented. B.W.

N82-29147# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PARTICLE BEAM WEAPONS
Liao Xianwang 31 Mar. 1982 12 p Transl. into ENGLISH from Hangkong Zhishi (China), no. 3, Mar. 1980 p 26-28
(AD-A114383; FTD-ID(RS)T-0140-82) Avail: NTIS HC A02/MF A01 CSCL 20/7

The use of particle accelerators as military weapons is discussed. Special attention is given to forecasting the advanced technology needed for such a future development. L.F.M.

N82-29148# Sargent and Lundy, Engineers, Chicago, Ill.
NON-US ADVANCED LOW-LEVEL RADWASTE TREATMENT SYSTEMS Interim Report
L. C. Oyen and R. F. Tucker, Jr. Sep. 1981 114 p refs
(EPRI Proj. 1557-1)
(DE82-900852; EPRI-NP-2055) Avail: NTIS HC A06/MF A01

A review of power plant radwaste treatment practices and research in Canada, Japan, Korea and Europe is given. In addition to a review of the available English language literature, visits were made to power plants and research centers in Europe and Japan and to private and government agencies in Korea. the nuclear research centers and power plants which were visited in Japan made use of volume reduction (VR) techniques and on site storage facilities. VR techniques were in use at the two major nuclear research centers in West Germany, and several power plants have made plans to use VR systems. Research on leaching was also being carried out in Japan because they intend to dispose of low level radioactive waste by deep sea disposal. Information concerning the VR systems in Canada included in this report is based on a trip to the Bruce Nuclear Power Development Station in 1977 and on reports and personal communications with Ontario Hydro engineers. The status of the work on radwaste VR systems and radwaste incinerators in the United States is updated along with other significant events concerning VR systems. DOE

N82-29149# Department of Energy, Las Vegas, Nev. Operations Office.
NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS Quarterly Report, Jul. - Sep. 1981
Dec. 1981 103 p
(DE82-005879; NVO-196-28) Avail: NTIS HC A06/MF A01

Eight tasks for nuclear waste storage are presented: systems, waste package, site, repository, regulatory and institutional, test facilities, and land acquisition. The purpose of the investigations are to develop or improve the technology of nuclear waste storage and disposal and to determine whether the selected underground rock media on or adjoining the Nevada Test Site are technically acceptable for a licensed high level nuclear waste repository. DOE

N82-29150# Department of Energy, Las Vegas, Nev. Operations Office.
NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS Quarterly Report, Apr. - Jun. 1981
Aug. 1981 78 p
(DE82-004722; NVO-196-26) Avail: NTIS HC A05/MF A01

The Nevada Nuclear Waste Storage Investigations (NWSI) improvement of the technology of nuclear waste storage and disposal and determination whether selected underground rock media on or adjoining the Nevada Test Site are technically acceptable for a licensed, permanent, high level nuclear waste repository is examined. The NNWSI project work breakdown structure is comprised of eight tasks: systems, waste package, site, repository, regulatory and institutional, test facilities, land acquisition, and program management. Some of the highlights are: initial screening studies of candidate waste package alloys in tuff groundwater were completed; installation of the constant air monitoring system and the remote area monitoring system was completed; a transport model to describe the potential behavior of radionuclides in tuff was developed; a diaphragm diffusion cell was constructed for directly measuring the diffusion properties of tuff; the mineralogy and petrology of the 6000 foot section of the first major exploratory stratigraphic hole at Yucca Mountain; a series of numerical experiments were reported to employ nuclear explosions and earthquake data in a simultaneous inversion for crustal velocities and station delays to improve the accuracy of earthquake location; a three dimensional material model was developed for predicting jointed rock-mass response. DOE

N82-29151# Rockwell International Corp., Richland, Wash. Energy Systems Group.
LONG-TERM HIGH-LEVEL DEFENSE WASTE TECHNOLOGY Progress Report, Jan. - Mar. 1981
Jun. 1981 59 p refs
(Contract DE-AC06-77RL-01030)
(DE82-005755; RHO-LD-81-101-B) Avail: NTIS HC A04/MF A01

Seven classes of waste sites were identified for evaluation. A safety assessment is being conducted of continued in tank storage. Conceptual design of Project B-340a, Waste Management Test Facility was 90% completed; it will provide a waste tank mockup test stand for conducting large scale equipment development. The HEATING-5 code was used to determine tank internal waste and structural concrete temperatures that would result from filling the dome void space with several different materials and covering the tanks with a soil barrier. A methodology was developed for determining in tank waste inventories. Forty-five concrete samples were prepared using synthetic salt cake, Redox sludge, and various additions; cesium and sodium leach rates were comparatively high. Bitumen samples were prepared using synthetic salt cake and Redox sludge. Cesium and sodium leach rates were comparatively low. DOE

N82-29152# Systems Consultants, Inc., Washington, D. C.
ENERGY AND SOLID/HAZARDOUS WASTE
Dec. 1981 238 p refs Prepared in cooperation with Argonne National Lab., Ill.
(Contract DE-AC02-80EV-10154)
(DE82-006964; DOE/EV-10154/2) Avail: NTIS

HC A11/MF A01

The past and potential future solid and hazardous waste impacts from energy development are addressed and the major environmental, legislation applicable to solid and hazardous waste generation and disposal are summarized. A glossary of terms and acronyms used to describe and measure solid waste impacts of energy development is included. DOE

N82-29153# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Raumfahrttechnik.

DEPOSITION OF HIGHLY ACTIVE NUCLEAR WASTES [DIE DEPONIE FUER HOCHAKTIVE NUKLEARABFAELLE]

H. O. Ruppe and D. Hayn Jun. 1981 36 p refs In GERMAN

(TUM-LRT-TB-81/3) Avail: NTIS HC A03/MF A01

The disposal of nuclear wastes in Earth orbits at 1000 km altitude is studied. The highly active wastes are melted in glass blocks, packed in a steel jacket and cooled. The construction of these glass blocks is described. A waste disposal program is proposed. The technical and fuel requirements for the carrier rockets are discussed. The transport of the nuclear wastes to the Earth orbits is depicted. Different alternatives are presented. Author (ESA)

N82-29154# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Raumfahrt.

DEVELOPMENT AND CONSTRUCTION OF SEPARATOR RODS FOR THE DOUBLE CIRCULAR GUIDE SYSTEM (DCS): CIRCULAR GUIDE RADII R1=0.05/0.75 MM; R2=0.04/0.025 MM [ENTWICKLUNG UND HERSTELLUNG VON TRENNROHREN MIT DEM DOPPELUMLENKSYSTEM (DUS) (UMLENKRADIEN R1 = 0,05/0,075; R2 = 0,04/0,025)]

Bichler, Brunner, and Simon 28 Jan. 1982 36 p In GERMAN

(MBB-UR-534-82-O) Avail: Issuing Activity

Development for series production of compact nuclear fuel separator rods is described. Rational production methods for separator jets were sought. A modular unit of the DCS element was built up and a ten-rod prototype chamber was constructed. However, the DCS model did not perform satisfactorily and further system modifications are called for Author (ESA)

74 OPTICS

Includes light phenomena.

N82-29155*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

BRDF MEASUREMENTS OF SUNSHIELD AND BAFFLE MATERIALS FOR THE IRAS TELESCOPE

Sheldon M. Smith May 1982 18 p refs

(NASA-TM-84235; NAS 1.15:84235) Avail: NTIS HC A02/MF A01 CSCL 20F

Measurements of the far-infrared bidirectional reflectance distribution functions (BRDF) of four samples of Martin Black coating and one sample of gold coated aluminum from the telescope to be flown on the Infrared Astronomy Satellite (IRAS) are presented. At incidence angles near 35 deg Martin Black is a diffuse reflector at wavelengths as long as 36 microns. The gold coated aluminum sample from the IRAS sunshield has a visible grain which causes a strong diffraction enhancement of the BRDF at large nonspecular angles. This enhancement from the sunshield will increase the stray light level inside the telescope. Author

N82-29156 Royal Signals and Radar Establishment, Malvern (England).

THE INFLUENCE OF THE TEMPERATURE COEFFICIENT OF REFRACTIVE INDEX ON A THERMAL IMAGER

I. C. Carmichael 1981 32 p refs

(RSRE-Memo-3398; BR83095) Avail: NTIS HC A03/MF A01

The temperature coefficient of refractive index for germanium was determined in the 8 to 12 and 3 to 5 microns wavebands. The Strehl intensity ratio and frequency response of an optical system are related to a lens temperature change, and a simple factor for a comparison of different lens materials is included. The relative change in minimum resolvable temperature difference (MRTD) of a thermal imaging system is shown for a defocused optical system, where the defocus is related to a lens temperature change. It is shown that the criteria for good optical performance can be applied to the relative change in MRTD for a thermal imager and that the Marechal approximation to the Strehl ratio can be used to determine a tolerance on a change in lens temperature. Author (ESA)

N82-29157# Eastman Kodak Co., Rochester, N. Y. Apparatus Div.

ULTRA-LIGHTWEIGHT MIRROR MANUFACTURING AND RADIATION RESPONSE STUDY Final Technical Report, 6 Nov. 1980 - 31 Mar. 1981

T. C. Fitzsimmons and David A. Crowe Griffiss AFB, N.Y. RADC Aug. 1981 119 p

(Contract F30602-81-C-0008; ARPA Order 3503; AF Proj. C503)

(AD-A106998; RADC-TR-81-226) Avail: NTIS HC A06/MF A01 CSCL 13/8

The requirements for making ultra-lightweight mirrors of Ultra-Low Expansion (ULE) fused silica by frit bonding are investigated. A manufacturing assessment of the facilities needed to scale the mirror technology to 4 meters in diameter is included. A front surface flux loading thermal test of a.5M diameter frit bonded ULE mirror is also included. The test was supported by detailed modeling and analysis. Author

N82-29158# Honeywell Corporate Material Sciences Center, Bloomington, Minn.

ALKALI HALIDE FLIR LENS DEVELOPMENT Final Technical Report, 1 Oct. 1979 - 31 1981

R. H. Anderson, R. J. Stokes, T. J. Moravec, J. W. Lin, F. M. Schmit, J. F. Ready, D. K. Greenlaw, and D. Stoltzmann Oct. 1981 149 p refs

(Contract MDA903-80-C-0098; DARPA Order 3833)

(AD-A113845; HR-81-269-16-59) Avail: NTIS HC A07/MF A01 CSCL 20/6

This report describes development of materials and processes for environmental protection of alkali halide lenses. The alkali halide lenses are fabricated by direct hot forging, which yields a finished lens without need for polishing. These lenses are intended for potential application in FLIR thermal imaging systems. The lenses require coatings to protect them against water vapor in the atmosphere. The main emphasis in this report has been development of protective coatings for potassium bromide lenses. The most favorable coating developed consisted of a multilayer structure of arsenic triselenide, polyethylene and plasma-polymerized ethanes. This coating provides antireflective properties and minimal protection against water vapor. It does not meet the severe humidity specifications of Mil-Std-810B. In addition forging methods to fabricate lenses from KRS-5 were investigated. Optical testing methods were developed to determine the performance of the forged lenses. Author (GRA)

N82-29159# Sperry Research Center, Sudbury, Mass.

DESIGN AND FABRICATION OF MULTIMODE OPTICAL SWITCHES Final Technical Report, 5 Jun. 1980 - 5 Sep. 1981

Richard A. Soref Griffiss AFB, N.Y. RADC Mar. 1982 223 p refs

(Contract F19628-80-C-0147; AF Proj. 2305)

(AD-A113812; SRC-CR-81-54; RADC-TR-82-22) Avail: NTIS HC A10/MF A01 CSCL 20/6

A new optical switching component for multimode fiber-optic networks has been developed. This voltage-controlled switch is an 8-port device coupled by GRINrod lenses to four input fibers and to four output fibers (graded index, 50 micron core diameter). The device switches light from any input fiber to any output fiber in a simultaneous 4-fold input/output pairing, and there are 24 such states in this nonblocking matrix switch. Switching is accomplished via controlled reflection from two 6 micron layers of nematic liquid crystal. This switch is the first multimode, electro-optic, fiber-optic matrix. Construction is simple and compact; only four glass prisms and two liquid layers are used in the switch. The matrix architecture is based on a new

dual-switching-array concept, a two stage interconnection that provides very low levels of optical crosstalk; more than 53 dB below the optical input level. The 5-ms on/off response time is faster than that of electro-mechanical matrices, although the 40 Vrms addressing voltage is higher. The optical insertion loss had a minimum value of 6dB and an average value of 15 dB. The latter is due to misalignment of fibers during attachment to the switch, which can be remedied. Because the present switch does not use moving parts, it is quite reliable. Author (GRA)

N82-29160# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.

FINE RESOLUTION IMAGING OF SPACE OBJECTS Final Scientific Report, 1 Oct. 1979 - 31 Oct. 1981

James R. Fienup, ed. Feb. 1982 211 p refs

(Contract F49620-80-C-0006; AF Proj. 2311)

(AD-A113911; ERIM-145400-14-F; AFOSR-82-0289TR) Avail: NTIS HC A10/MF A01 CSCL 05/8

This report describes the results of a two-year research effort to investigate the reconstruction of fine-resolution images of space objects using Earth-bound optical telescopes despite the turbulence of the atmosphere. The results of this research are an indication that, using an iterative reconstruction algorithm, it is feasible to reconstruct diffraction-limited images from the Fourier modulus (or autocorrelation) data provided by stellar speckle interferometry. Methods of compensating for systematic errors and noise present in astronomical data were developed and were applied to binary star data, from which a diffraction-limited image was successfully reconstructed. It was analytically shown that the following types of objects are uniquely specified by their Fourier modulus: objects consisting of separated parts satisfying certain disconnection conditions, objects consisting of collections of distinct points, and objects with radial symmetry. Experimental indications are that complicated two-dimensional objects are usually unique. An equivalence of the error-reduction iterative reconstruction algorithm and the steepest-descent gradient search method was shown, and the convergence of this algorithm was proven. However, the input-output iterative algorithm and other gradient search algorithms were found to converge much faster in practice. A survey of other applications of the iterative algorithm was performed, and it was found to be remarkably useful in solving problems for a wide range of applications. GRA

N82-29161# Eikonix Corp., Bedford, Mass.

APPLICATION OF PHASE RETRIEVAL Final Technical Report, 23 Jun. 1980 - 31 Jul. 1981

Robert Gonsalves Griffiss AFB, N.Y. RADC Feb. 1982 119 p refs

(Contract F30602-80-C-0186; ARPA Order 3655)

(AD-A113383; EC/2112901; RADC-TR-81-352) Avail: NTIS HC A06/MF A01 CSCL 20/6

The purpose of this study was to determine how the phase retrieval algorithm developed under previous contract, worked in the face of real world constraints. The problems of finite detector size, noise in the measurements, and non-point objects were handled analytically, experimentally and by blind testing. No significant problems were uncovered. Author (GRA)

N82-29162# Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.

IMAGE SEGMENTATION USING SIMPLE MARKOV, FIELD MODELS Final Report

F. R. Hansen and H. Elliott Oct. 1981 44 p refs

(Contracts N00014-82-K-0076; N00014-75-C-0518)

(AD-A112914; JU81-DELENG-1R) Avail: NTIS HC A03/MF A01 CSCL 20/6

By modelling a picture as a two-state Markov field, MAP estimation techniques are used to develop suboptimal but computationally tractable binary segmentation algorithms. The algorithms are shown to perform well at low signal to noise ratios, and analytical procedures are developed for estimating the Markov field transition probabilities. In addition, extensions of this approach to the multi-spectral and multi-region cases are discussed. Author (GRA)

N82-29163# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Chemical Systems Lab.

EXTINCTION BY AEROSOL CLOUDS OF NONSPHERICAL PARTICLES AT ARBITRARY WAVELENGTHS Special Publication, Jan. - Jun. 1981

Janon F. Embury Mar. 1982 14 p

(DA Proj. 1L1-62622-A-554)

(AD-A113535; AD-E410514; ARCSL-SP-81021) Avail: NTIS HC A02/MF A01 CSCL 20/6

Extinction by a cloud consisting of many aerosol particles has been found to fall into two distinct wavelength regions which are adequately described by the geometric optics theory and the Rayleigh theory. Because the cloud consists of many different particles, the narrow extinction resonance structure of individual particles is lost, and extinction is governed by shape and size as predicted by geometric optics. At longer wavelengths, particles are in the Rayleigh region, and extinction for a large variety of particle shapes is predicted by the Rayleigh ellipsoidal theory. The transition region lying between the applicability of these two simple theories occupies only about one wavelength decade. GRA

N82-29164# Louisiana State Univ., Baton Rouge. Center for Wetland Resources.

INFRARED TRANSMITTANCE OF MARINE ATMOSPHERES

Lawrence J. Rouse, Jr. 1982 12 p refs

(Contract N00014-75-C-0192; NR Proj. 388-002)

(AD-A114414; TR-348) Avail: NTIS HC A02/MF A01 CSCL 04/1

The accuracy with which single channel satellite initiated radiometers can detect sea surface temperature differences is discussed. A relationship among sea surface temperature differences, satellite measures of these differences, atmospheric transmittance in the infrared, and atmospheric water vapor content is presented. A comparison of model calculations with experimental data reveals differences that require further investigation. The dangers associated with infrared remote sensing of sea surface temperatures in the tropic and temperate regions are also considered. Author

N82-29165# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

POLARIZED QUASI-OPTICAL PHASE SHIFTER

M. S. Yanovskiy and B. N. Knyazkov 31 Mar. 1982 11 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. (USSR), v. 13, no. 10, Oct. 1970 p 1199-1204

(AD-A114300; FTD-ID(RS)T-0303-82) Avail: NTIS HC A02/MF A01 CSCL 09/3

A polarized phase shifter for a quasi-optical transmission line is described and the dependence of the phase shift on the turning angle of the half-wave phase section is determined. The operation of the device in a frequency band is examined. GRA

N82-29166# Arizona Univ., Tucson. Optical Sciences Center.

COMPLIANT SURFACES Technical Report, 1 Jan. 1981 - 28 Feb. 1982

F. A. Hopf Apr. 1982 21 p ref

(Contract N00014-81-K-0291)

(AD-A114309) Avail: NTIS HC A02/MF A01 CSCL 20/6

The results of experiments on the application of nonlinear optical interferometers to the measurement of compliant surfaces are presented. The interferometer is shown to be suitable for this application. However, the interferometer at 1.06 microns may not be sensitive enough to contour the observed streamwise deformations on the surface. A shorter-wavelength device should be more useful. Author

N82-29167# Army Electronics Research and Development Command, Fort Belvoir, Va. Night Vision and Electro-Optics Labs.

NIGHT VISION AND ELECTRO-OPTICS TECHNOLOGY TRANSFER, 1972 - 1981

Richard W. Fulton and Gary F. Mason 15 Sep. 1981 54 p refs

(AD-A114134; DELNV-266-01) Avail: NTIS HC A04/MF A01 CSCL 20/6

The purpose of this special report, 'Night Vision and Electro-Optics Technology Transfer 1972-1981,' is threefold: To illustrate, through actual case histories, the potential for exploiting

a highly developed and available military technology for solving non-military problems. To provide, in a layman's language, the principles behind night vision and electro-optical devices in order that an awareness may be developed relative to the potential for adopting this technology for non-military applications. To obtain maximum dollar return from research and development investments by applying this technology to secondary applications. This includes, but is not limited to, applications by other Government agencies, state and local governments, colleges and universities, and medical organizations. It is desired that this summary of Technology Transfer activities within Night Vision and Electro-Optics Laboratory (NV/EOL) will benefit those who desire to explore one of the vast technological resources available within the Defense Department and the Federal Government.
GRA

N82-29168# Oak Ridge Y-12 Plant, Tenn. Fabrication Systems Dept.
MINIATURE INTERFEROMETER TRANSDUCER: AN OPTICAL SYSTEM DESCRIPTION AND COST ANALYSIS
R. C. Yoder Nov. 1981 15 p refs
(Contract W-7405-eng-26)
(DE82-004653; Y-2257) Avail: NTIS HC A02/MF A01

A highly accurate position reading probe with an extended length of travel (by comparison to a linear variable differential transducer) consists of a small (1/2 in. diameter by 4 in. length) air bearing probe head, the exact position of which is read out via an internally constructed laser interferometer. Essential features of this device involve a spatially coherent coupling of a He-Ne laser source to the transducer head through a flexible, graded index, fiber optic waveguide, as well as the relay of the interferometric output image through a flexible, image carrying fiber bundle to a remote station for signal detection and processing. This allows a modest handling flexibility of the transducer head while locating the laser source and signal reception hardware at some remote fixed location. DOE

N82-29169# Scientific Translation Service, Santa Barbara, Calif.
THERMO-OPTICAL PROPERTIES OF OPTICAL GLASSES
H. Guosong and Chen Sizheng Oct. 1981 11 p Transl. into ENGLISH of "Quangxue Boli de Reguang Xiengzhi" Rept. LL-03075 Shanghai Inst. of Opt. and Fine Mech. Acad. Sinica, Communist China p 1-12 Prepared for California Univ. Lawrence Livermore Lab.
(Contract W-7405-eng-48)
(DE82-003681; UCRL-Trans-11734; LL-03075) Avail: NTIS HC A02/MF A01

To lower the thermal disturbance of optical elements due to ambient temperature variations, three thermo-optical coefficients W, P, Q are presented to describe the changes in the optical properties of optical glasses in a temperature field. Methods for measuring the three coefficients as well as the experimental results for some optical glasses are also given. Finally, the possibility of lowering the thermal disturbance of optical elements is also discussed. DOE

N82-29170# York Coll., Jamaica, N. Y.
FINE-GRAINED HODOSCOPES BASED ON SCINTILLATING OPTICAL FIBERS
S. R. Borenstein and R. C. Strand (Brookhaven National Lab., Upton, N.Y.) 1981 12 p refs
(Contract DE-AC02-81ER-40035)
(DE82-006248; DOE/ER-40035/1) Avail: NTIS HC A02/MF A01

In order to exploit the high event rates at ISABELLE, it will be necessary to have fast detection with fine spatial resolution. The authors are currently constructing a prototype fine grained hodoscope, the elements of which are scintillating optical fibers. The fibers have been drawn from commercially available plastic scintillator which has been clad with a thin layer of silicone. So far it has been demonstrated with one mm diameter fibers, that with a photodetector at each end, the fibers are more than 99% efficient for lengths of about 60 cm. The readout will be accomplished either with small diameter photomultiplier tubes or avalanche photodiodes used either in the linear or Geiger mode. The program of fiber development and evaluation will be described. The status of the APD as a readout element will be discussed. Finally, an optical encoding readout scheme will be described for events of low multiplicity. DOE

N82-29171# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.
COMPTONIZATION OF PHOTONS IN COMPACT COSMIC X-RAY SOURCES [COMPTONISIERUNG VON PHOTONEN IN KOMPAKTEN KOSMISCHEN ROENTGENQUELLEN]
Marion Lorentz Nov. 1981 73 p refs In GERMAN
(MPI-PAE/Extraterr-171; ISSN-0340-8922) Avail: NTIS HC A04/MF A01

Optical thickness was chosen between 0.5 and 10, and electron temperature between 1 and 150 keV in order to study the formation of power spectra as they are astronomically observed. The exact relativistic calculation results in higher energy transport and hence flatter spectra than nonrelativistic approximative calculations. The influence of temperature distributions is small. The reaction of the radiation on the plasma was determined as well as cooling rate and radiation pressure as a function of the coordinate perpendicular to the slab. By adding a cooler plasma to the hot slabs, the form of the X-ray spectra is maintained, but slabs with lower optical thickness suffice. Author (ESA)

N82-29172# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
AN INEXPENSIVE 15 MHz FIBER OPTIC ANALOG DATA LINK Research and Training Programme on Controlled Thermonuclear Fusion and Plasma Physics (EUR-NE)
E. Lagerstroem, G. Kindberg, G. Haegerstroem, and J. R. Drake 6 Mar. 1982 9 p Sponsored by Euratom
(TRITA-PFU-82-05; ISSN-0348-7644) Avail: NTIS HC A02/MF A01

Circuit diagrams for the transmitter and receiver for an analog data link are presented. Analog signals are transmitted over distances of several meters via a fiber optic cable. System bandwidth is 10 to 15 MHz with a gain of unity for amplitudes of + or - 0.5 V. Transmission is switched to dc if moderate drift is acceptable. The signal to noise ratio is 46 dB which can be improved if a 5 MHz filter is used with transient recorders with a 20 MHz digitizing rate. A surge arrester protects against very fast high amplitude voltage spikes. Author (ESA)

N82-29173# Federal Highway Administration, Washington, D.C. Traffic Systems Div.
FIBER OPTICS TECHNOLOGICAL REVIEW AND ASSESSMENT FOR TRAFFIC CONTROL Final Report, Oct. 1979 - Aug. 1981
Warren F. Dorsey Sep. 1981 65 p refs
(PB82-145616; FHWA/RD-81/160) Avail: NTIS HC A04/MF A01 CSCL 20F

Fiber optics technology is assessed. The key areas of discussion include fiber optics basic principles, components, design considerations and applications. The developmental areas of this technology are forecasted. Fiber optics technology for traffic control is discussed. GRA

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N82-29174 Academy of Sciences (USSR), Moscow. Space Research Inst.
INSTANTONS IN THE QUARK PLASMA. THE ROLE OF FERMION ZERO MODES
A. A. Abrikosov, Jr. 1981 15 p refs
(Rept-677) Copyright. Avail: SOD

The interaction of instantons with the dense plasma of the light quarks is studied by means of the exact wave functions in the selfdual field. Due to fermion zero modes the interaction appears at the first order of the perturbation theory which suppress the large instantons. Author

N82-29175# Nagoya Univ. (Japan). Inst. of Plasma physics.
FEEDBACK CONTROL OF THERMAL RUNAWAY WITH

COMPRESSION-DECOMPRESSION
M. Okamoto, M. Ohnishi, and K. Hirano Mar. 1982 38 p refs
(IPPJ-573) Avail: NTIS HC A03/MF A01

The active feedback control by means of major radius compression-decompression was studied for the purpose of burn control in a self-ignited Tokamak. Based on a zero dimensional transport code, together with a simple but realistic feedback control system which regulates the vertical magnetic field applying compression-decompression to the plasma, numerical calculations were carried out for Alcator, Coppi-Mazzucatto and Hirshman-Molvig scalings taking an INTOR like Tokamak as an example. It is shown that the feedback control can move the plasma automatically to the marginal ignition point from the sub- or super-ignited region after the additional heating is stopped. Once the plasma has found the marginal ignition point, the control can maintain its operation point suppressing the thermal runaway completely without any significant change in major radius. Linear stability analysis for general type of scalings has shown that the control is achievable for suitable gain even if the time lag of the system is longer than the thermal runaway time. Dependences of the stability on scaling laws are also studied.
B.W.

N82-29176# Harry Diamond Labs., Adelphi, Md.
ON THE NONLINEAR CONDUCTIVITY TENSOR FOR AN UNMAGNETIZED RELATIVISTIC TURBULENT PLASMA
Howard E. Brandt Feb. 1982 29 p refs
(DA Proj. 1L1-61101-A-91A)
(AD-A113699; HDL-TR-1970) Avail: NTIS HC A03/MF A01 CSCL 20/9

The symmetry properties of the second-order nonlinear conductivity tensor for an unmagnetized, relativistic, and weakly turbulent plasma are important in the analysis of the collective bremsstrahlung instability. This tensor has some exact symmetries that, if resonant wave-particle interactions are neglected, become the widely known symmetry related to the Manley-Rowe relations, crossing symmetry, and the nondissipative nature of the nonlinear current. Using the well-known expression for the conductivity from plasma turbulence theory, a polynomial representation for the tensor is obtained in which all derivatives are removed and the pole structure is clearly exhibited. The exact symmetries are obtained by a lengthy algebraic reduction using this representation. Author (GRA)

N82-29177# Science Applications, Inc., McLean, Va.
RADIATION FROM HIGH TEMPERATURE PLASMAS Final Report, 27 Aug. 1980 - 31 Dec. 1981
Edward Kane and John Apruzese Feb. 1982 193 p refs
(Contract N00173-80-C-0493)
(AD-A113597; SAI-82-686-WA) Avail: NTIS HC A09/MF A01 CSCL 20/9

The dominant physics affecting spherical and cylindrical plasma implosions is studied. Detailed modeling of opacity sources, line and continuum emission, and coupled hydrodynamics is presented. Simulations of actual experimental spectra, plasma mixture experiments, and improved photon transport methods are described. Z-pinch code benchmarks, and output predictions for various elements and mass loads are given. GRA

N82-29178# Indiana Univ., Bloomington. Dept. of Chemistry.
REDUCTION OF SPECTRAL INTERFERENCES IN INDUCTIVELY COUPLED PLASMA-ATOMIC EMISSION SPECTROMETRY BY SELECTIVE SPECTRAL-LINE MODULATION Interim Technical Report
S. W. Downey and G. M. Hieftje 31 Mar. 1982 37 p refs
(Contract N00014-76-C-0838; NR Proj. 051-622)
(AD-A112886; TR-45; IU-53) Avail: NTIS HC A03/MF A01 CSCL 07/4

Spectral interferences in inductively coupled plasma (ICP) emission spectrometry can be significantly reduced through the use of selective spectral-line modulation (SLM). In this method, a mirrored, rotating chopper directs the emission from an ICP alternately through and around a flame; selective modulation is achieved when the flame contains absorbing atoms identical to emitting atoms in the ICP. The ability of SLM to minimize broad-band, narrow line and scattered light spectral interferences is demonstrated. Signal-to-background ratios for SLM detection are shown to be higher than those obtained by conventional detection. The effect of modulating conditions on working curve slope and linearity is discussed and the limitations of the SLM method are critically evaluated. Author (GRA)

N82-29179# Naval Research Lab., Washington, D. C. Plasma Theory Branch.
DRIFT RESISTIVE INTERCHANGE AND TEARING MODES IN CYLINDRICAL GEOMETRY Interim Report
J. M. Finn, W. M. Manheimer, and T. M. Antonsen, Jr. (Science Applications, Inc., McLean, Va.) 13 Apr. 1982 52 p refs
(Contract EX-76-A-34-1006)
(AD-A113499; NRL-MR-4783) Avail: NTIS HC A04/MF A01 CSCL 20/9

Resistive interchange and tearing modes are studied including the effects of electron parallel pressure gradient and ion polarization drift (Hall terms) as well as finite plasma compressibility and perpendicular resistivity. It is found that for unfavorable curvature and weak tearing forces (positive but small delta) all modes are stabilized provided the effects of the Hall (drift) terms are large enough. The principal stabilizing influences are plasma compression and coupling to outgoing drift waves. The relevance to reversed field pinch and spheromak experiments is discussed. Author (GRA)

N82-29180# Naval Research Lab., Washington, D. C.
SPOT SPECTROSCOPY: LOCAL SPECTROSCOPIC MEASUREMENTS WITHIN LASER PRODUCED PLASMAS Interim Report
M. J. Herbst, F. G. Burkhalter, J. Grun, R. R. Whitlock, and M. Fink 20 Apr. 1982 18 p refs
(AD-A114165; NRL-MR-4812) Avail: NTIS HC A02/MF A01 CSCL 20/9

Use of a locally embedded tracer in laser-irradiated solid targets yields a localized source of diagnostic X-ray line radiation in the blowoff plasma. This technique potentially eliminates problems of chord-integration over regions of varying density and temperature in an inhomogeneous plasma, and reduces complications due to plasma opacity effects in the interpretation of spectra. Spectra obtained in an experimental test of this new technique are of a quality superior to those obtained from standard laser-produced plasmas, and should provide the best tests to date of spectroscopic models for these plasma conditions. Author (GRA)

N82-29181# Naval Research Lab., Washington, D. C.
STRUCTURING CAUSED BY RAYLEIGH-TAYLOR INSTABILITY
S. Brecht, E. Hyman, and P. J. Palmadesso 24 Apr. 1982 21 p refs
(AD-A114085; NRL-MR-4790) Avail: NTIS HC A02/MF A01 CSCL 17/8

The structuring that a LWIR system might detect is addressed. The results of an analytic study of Rayleigh-Taylor instabilities were incorporated into a code which tracks the temporal behavior of various plasma quantities. The results indicate that structuring will occur in times less than 5 secs. Estimates of maximum and minimum wavelengths and of growth rates are provided. The structured regions contain sizable concentrations of metallic and oxygen ions and may well present difficulties to LWIR systems depending on the chemical activity present in the structure.
Author

N82-29182# TRW Defense and Space Systems Group, Redondo Beach, Calif.
RF PLASMA SOURCES FOR NEUTRAL-BEAM-INJECTION SYSTEMS. PHASE 1: DEFINITION STUDY Final Report
Nov. 1981 31 p refs
(Contract DE-AC03-81ER-52071)
(DE82-004193; TRW-SN-36833) Avail: NTIS HC A03/MF A01

The key design issues driving the selection of a plasma generation method are discussed. The main programmatic issue in source selection was ease of implementation on existing and planned neutral beam systems. The two source concepts selected for detailed consideration, one employing electron cyclotron heating at microwave frequencies and one employing radio frequency induction heating, are described. preliminary radio

frequency induction hydrogen discharge experiments in a geometry suitable for neutral beam system application are described. DOE

N82-29183# Sandia Labs., Albuquerque, N. Mex. Directorate of Pulsed Energy Programs.

PARTICLE-BEAM FUSION Progress Report, Jan. - Jun. 1981

1981 443 p refs

(Contract DE-AC04-76DP-00789)

(DE82-002900; SAND-81-1459) Avail: NTIS HC A19/MF A01

Research progress is described for each of the following areas: (1) target and deposition theory; (2) target experiments; (3) particle beam source theory; (4) diagnostics development; (5) particle beam experiments; (6) pulsed power research; and (7) pulsed power applications. DOE

N82-29184# Oak Ridge National Lab., Tenn. Fusion Energy Div.

PLASMA ASSESSMENTS FOR THE FUSION ENGINEERING DEVICE (FED)

Y. K. M. Peng, P. H. Rutherford (Princeton Plasma Physics Lab.), J. F. Lyon, D. Blackfield (Massachusetts Inst. of Technology), S. K. Borowski (Michigan Univ.), D. R. Cohn (Massachusetts Inst. of Technology), L. M. Hively (General Electric Co.), J. A. Holmes, W. A. Houlberg, H. C. Howe et al Nov. 1981 31 p refs

(Contract W-7405-eng-26)

(DE82-004649; ORNL/TM-7901) Avail: NTIS HC A03/MF A01

An initial range of plasma assumptions and scenarios was examined for the US Tokamak fusion engineering device (FED) concept. The results suggest that the current FED baseline parameters of R = 4.8 m, B/sub t/ = 3.6 T, a = 1.3 m, b = 2.1 m (D-shape), and I/sub p/ = 4.8 to 5.4 MA are appropriate for achieving its nominal goals of P(fusion) approx. = 180 MW and a plasma Q greater than or equal to 5 a pulse length greater than 100 s. However, large uncertainty still exists in the areas of current startup, ion cyclotron wave launching, influence of plasma shape on achievable beta, in purity control, plasma edge transport, and plasma disruption. Various options and remedies, suggested to alleviate the impact of the uncertainty on the FED design concept, appear promising because they can be studied experimentally and are not expected to lead to fundamental design modifications of FED. DOE

N82-29185# California Univ., Livermore. Lawrence Livermore Lab.

MIRROR FUSION TEST FACILITY STATUS

T. K. Fowler and K. I. Thomassen 18 Nov. 1981 13 p

(Contract W-7405-eng-48)

(DE82-006187; UCID-19241) Avail: NTIS HC A02/MF A01

A review of the mirror fusion test facility (MFTF) physics and project status is given. The tandem mirror concept is the leading alternative to the Tokamak magnetic fusion program. Mirror reactors have two advantages: steady state rather than pulsed opration, and a simpler shape, a straight tube as compared with the doughnut shape of the Tokamak. Progress is made in identifying promising configurational improvements and in assessing their impact on the MFTF-B design. DOE

N82-29186# California Univ., Livermore. Lawrence Livermore Lab.

PLASMAS IN PARTICLE ACCELERATORS: A HYDRODYNAMIC MODEL OF THREE-DIMENSIONAL ELECTROSTATIC INSTABILITIES

James W-K. Mark, Geoffrey A. Krafft, and Tai-Sen F. Wang 1 Dec. 1981 23 p refs

(Contract W-7405-eng-48)

(DE82-006182; UCID-18947-Pt-3-Rev-1) Avail: NTIS HC A02/MF A01

A hydrodynamic model is used to help isolate possible three dimensional space charge instabilities in beam plasmas of concern in designing heavy ion accelerators for inertial confinement fusion energy applications. The model provides an economic means for searching the large parameter space relevant to problems in which coupling of longitudinal and transverse motions is allowed. It is shown that the equilibrium axial hydrodynamic pressure of the beam plasma has a significant effect on the stability boundaries of a two-rotating-stream instability. when considering the resistive wall effect, this model shows a kink instability. The growth rate of some modes could be enhanced by increasing the equilibrium axial pressure. DOE

N82-29187# Columbia Univ., New York. Plasma Physics Lab.

NUMERICAL STUDY OF THE COLUMBIA HIGH-BETA DEVICE: TORUS-2

Ralph Izzo 1981 282 p refs Sponsored in part by NSF

(Contract DE-AS02-76ET-53016)

(DE82-007363; DOE/ET-53016/75; Rept-84) Avail: NTIS HC A13/MF A01

The ionization, heating and subsequent long time scale behavior of the helium plasma in the fusion device, Torus 2, is studied, while maintaining a high level of interaction with experimentalists. The device is operated as a toroidal z pinch to prepare the gas for heating. This ionization of helium is studied using a zero dimensional, two fluid code. It is essentially an energy balance calculation that follows the development of the various charge states of the helium and any impurities (primarily silicon and oxygen) that are present. The code is an atomic physics model of Torus 2. In addition to ionization, three body and radiative recombination processes are included. DOE

N82-29188# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

TOKAMAKS WITH HIGH-PERFORMANCE RESISTIVE MAGNETS: ADVANCED TEST REACTORS AND PROSPECTS FOR COMMERCIAL APPLICATIONS

L. Bromberg, D. R. Cohn, J. E. C. Williams, H. Becker, R. Leclaire, and T. Yang Oct. 1981 8 p refs Presented at the 9th Symp. on Eng. Probl. of Fusion Res., Chicago, 26 Oct. 1981

(Contract DE-AC02-78ET-51013)

(DE82-007366; DOE/ET-51013/24; PFC/CP-81-1; CONF-811040-147) Avail: NTIS HC A02/MF A01

Tokamak reactors with high performance resistive magnets which maximize advantages gained from high field operation and reduced shielding requirements, and minimize resistive power requirements were studied. High field operation provide very high values of fusion power density and n tau/sub e/ while the resistive power losses can be kept relatively small. Relatively high values of Q' = Fusion Power/Magnet Resistive Power can be obtained. The use of high field also facilitates operation in the DD-DT advanced fuel mode. The engineering and operational features of machines with high performance magnets are discussed. The production of fissile fuel, electricity generation with and without fissioning blankets and synthetic fuel production are also discussed. DOE

N82-29189# Los Alamos Scientific Lab., N. Mex.

INERTIAL FUSION PROGRAM Progress Report, 1 Jul. - 31 Dec. 1979

Frederick Skoberne, comp. and Helen M. Sinoradzki, ed. Oct. 1981 176 p refs

(Contract W-7405-eng-36)

(DE82-007361; LA-8511-PR) Avail: NTIS HC A09/MF A01

High energy short pulse CO2 laser systems for fusion research are discussed. Improvements in the eight beam Helios system are described. These improvements increased the reliability of the laser and permitted the firing of 290 shots, most of which delivered energies of approximately 8 kJ to the target. Modifications to Gemini are outlined, including the installation of a new target insertion mechanism. The redirection of the Antares program is discussed in detail, which will achieve a total energy of approximately 40 kJ with two beams. This redirection will bring Antares on line almost two years earlier than was possible with the full six beam system, although at a lower energy. Experiments with isentropically imploded Sirius-B targets are discussed, and X-ray radiation loss data from gold microballoons are presented, which show that these results are essentially identical with those obtained at glass laser wavelengths. Significant progress in characterizing laser fusion targets is reported. High quality metallic coatings, and the deposition of thick plastic coatings are described. Results in the development of X-ray diagnostics are reported, and research in the Los Alamos heavy ion fusion program is summarized. Results of investigations of phase conjugation research of gaseous saturable absorbers and of the

use of alkali-halide crystals in a new class of saturable absorbers are summarized. New containment vessel concepts for Inertial Confinement Fusion reactors are discussed, and results of a scoping study of four fusion fission hybrid concepts are presented. DOE

N82-29190# Brookhaven National Lab., Upton, N. Y.
STABILITY OF SUPERCONDUCTING ISABELLE DIPOLE MAGNETS
S. L. Wipf Apr. 1981 28 p
(Contract DE-AC02-76CH-00016)
(DE82-006843; BNL-51412) Avail: NTIS HC A03/MF A01

The minimum propagating zone (MPZ) concept is used to examine the causes of quenches in ISABELLE cosine theta superconducting dipole magnets. The size of disturbances large enough to exceed the MPZ and initiate quenches is estimated and compared with the size of disturbances which may be produced in the magnets. A suggestion for reducing the size of these disturbances through individual support of the coil block is outlined. DOE

N82-29191# Japan Atomic Energy Research Inst., Tokyo.
MHD STABILITY ANALYSIS CODE ERATO-J. USER'S MANUAL OF JAERI VERSION ERATO
Y. Tanaka, T. Matsuura, T. Takeda, M. Azumi, and S. Tokuda Aug. 1980 91 p refs
(DE81-700373; JAERI-M-9040) Avail: NTIS (US Sales Only) HC A05/MF A01; DOE Depository Libraries

Necessary resources of a computer system for the MHD stability calculations by the ERATO were estimated. These data and the procedure for carrying out a series of calculations using the ERATO-J(F-version) code are described. The ERATO-H(F-version), the first version of the ERATO code for the FACOM M200 computer system of JAERI computer center, was modified. The DIARY program was introduced to facilitate acquisition and sorting of the output data. DOE

N82-29192# Japan Atomic Energy Research Inst., Tokyo.
HEAT REMOVAL FROM THE SIMULATION ELECTRODE OF A HIGH POWER LOG PULSE ION SOURCE
H. Horiike, U. Kondoh, H. Morita, and S. Tanaka Oct. 1980 7 p refs
(DE81-700008; JAERI-M-9004) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

The cooling of a target that simulated an electrode of the ion source operating in a megawatt regime was investigated. A copper disk with thin parallel cooling tubes were bombarded by hydrogen beams of 1A to 4A at 30 KeV for up to 7.6 s. The average heat loading to the target surface and to the cooling surface was as high as 220 W/sq cm and 570 W/sq cm, respectively. The temperature of the target was measured by thermocouples and found to be suppressed below 2000 C owing to an increase of heat transfer coefficient by subcool boiling of the cooling water. On the basis of this result, the extraction electrode of an ion source for JT-60 can be designed to withstand the operation exceeding 35 A at 75 KeV for 10 s from the heat transfer point of view. DOE

N82-29193# Japan Atomic Energy Research Inst., Tokyo.
TOROIDAL PLASMA MHD EQUILIBRIUM CODE EQUCIR VERSION 1
H. Ninomiya, K. Shinya, and A. Kameari Oct. 1980 87 p refs
(DE81-700128; JAERI-M-9127) Avail: NTIS (US Sales Only) HC A05/MF A01; DOE Depository Libraries

A free boundary toroidal MHD equilibrium code "EQUCIR version 1" was developed. The program determines the magnetic flux distribution of a plasma at equilibrium in the given external field and constructs a set of circuit equations between the plasma and the external conductors. These circuit equations and the Grad-Shafranov equation are solved self consistently and the time evolutions of plama equilibria and currents in external conductors are determined at the same time. The currents in the external conductors are determined so that the plasma cross section and plasma parameters are to be maintained with desired ones. It is shown that this code is very useful for study of the Tokamak plasma equlibria, for design of the poloidal coil system and for investigation of experimental results. DOE

N82-29194# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Raumfahrttechnik.
PRODUCTION OF A FAST HIGH DENSITY PLASMA FLOW [ERZEUGUNG EINER SCHNELLEN PLASMASTROEMUNG HOHER DICHTE]
Eduard Igenbergs Dec. 1981 26 p refs In GERMAN
(TUM-LRT-TB-81/14) Avail: NTIS HC A03/MF A01

A flow was produced in an installation in which glass globules are accelerated in order to simulate micrometeoroids. The installation is described. The produced high velocity plasma (30 to 50 km/sec) is afterwards strongly compressed in order to obtain high density. The setup, consisting of coaxial accelerator and compression coil, was studied theoretically. The theoretical results are in good agreement with experiment. Author (ESA)

N82-29195# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics.
THE RADIAL VARIATION OF THE IONIZATION IN A COAXIAL PLASMA GUN OPERATED UNDER CRITICAL VELOCITY CONDITIONS
Ingvar Axnaes Dec. 1981 26 p refs Sponsored by Swedish Natural Science Research Council
(TRITA-EPP-81-07; ISSN-0348-7539) Avail: NTIS HC A03/MF A01

The radial variation of the ionization in a coaxial plasma gun is determined spectroscopically. The discharge current in the plasma gun is limited by external resistors in order to keep the plasma weakly ionized. The radial variation in the absolute intensity of the He 3889 A line is measured with an optical system which is independent of azimuthal asymmetry of the plasma in the gun. While the plasma in the gun is characterized by the critical velocity phenomenon, the current transport is totally different in different gases. In H2 and O2, a region with large ionization is found close to the anode. As a result, ion current dominates in the main body of the plasma. In He and Ne, the ionization is more evenly distributed and much smaller. The total discharge current is in this case mainly due to electrons emitted from the cathode. Author (ESA)

N82-29196# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
CONFINEMENT AND MAGNETOACOUSTIC HEATING OF A LOW DENSITY BELT PINCH PLASMA
V. Erckmann, G. Mueller, K. Schwoerer, J. Singethan, M. Thumm, and R. Wilhelm Sep. 1981 25 p refs Presented at 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 14-19 Sep. 1981
(IPF-81-8) Avail: NTIS HC A02/MF A01

Energy conversion efficiency in plasmas heated by electroacoustic waves is discussed. Toroidal high beta equilibria (beta = 20% to 50%) were investigated in a belt pinch configuration. When operating in the low electron density regime at temperatures around 200 eV, the ion gyroradius becomes comparable with the typical gradient length. Under these conditions, enhanced energy losses are observed. After magnetoacoustic wave excitation, efficient energy coupling in the low density plasma is found. For the first cyclotron harmonic, a pronounced increase of plasma beta and a power flux on the order of 50 MW/sqm are obtained. Central beta value is raised to 45%. Author (ESA)

N82-29197# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
ION EMISSION CHARACTERISTICS OF PLASMA FOCUS DEVICES
L. Bertalot, R. Deutsch, H. Herold, U. Jaeger, A. Mozer, M. Sadowski, and H. Schmidt Sep. 1981 19 p refs Presented at 10th European Conf. on Controlled Fusion and Plasma Phys., Moscow, 14-19 Sep. 1981
(IPF-81-9) Avail: NTIS HC A02/MF A01

Cellulose nitrate film investigations of angular distribution of ions from a single discharge are summarized and are compared with model calculations. The films were arranged in a semicircle and covered with Al foil steps for a rough energy resolution. Ions with energies up to 5 MeV are detected up to angles of 85 deg. The distributions are anisotropic, exhibit a characteristic intensity drop between 40 and 80 deg, and are often asymmetric to the z axis. Ions are emitted mostly in single bursts, and sometimes in multispike pulses. Deuterons of different energies

are generated by a common process, correlated in time with fast electrons or hard X-rays. Measured and predicted distributions agree best for sources close to the anode tip, either in, or upstream of, a constriction. Author (ESA)

N82-29198# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.

ION MOTION IN THE PLASMA FOCUS

R. Deutsch and U. Jaeger Dec. 1981 43 p refs
(IPF-81-11) Avail: NTIS HC A03/MF A01

Ion motion in the field of a zeta pinch was studied, using a simplified mathematical model of a cylindrical plasma, conducting a current of constant density. Because the cyclotron radius of fast ions in the plasma focus is on the order of the plasma radius, the ions are partially trapped in the plasma column. This trapping effect is characterized by a parameter which depends only on the electric current intensity and ion energy. In the case of local isotropical velocity distribution, the azimuthal magnetic field leads to an average drift of the ions in the direction of the electric current. The azimuthal magnetic field focuses the ions. This leads to density inhomogeneities, if constrictions exist in the plasma column. In the presence of the constrictions, supplementary trapping of the ions by magnetic field inhomogeneities appears. This leads to very pronounced peaks of the ion density in certain regions of the plasma focus. Author (ESA)

N82-29199# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.

FIRST 50 PULSE PER SEC THOMSON SCATTERING DIAGNOSTICS IN A TOKAMAK

K. Hirsch, H. Roehr (Max-Planck Inst. fuer Plasmaphysik, Garching, West Germany), H. Salzmann, G. Schramm (Max-Planck Inst. fuer Plasmaphysik, Garching, West Germany), and K.-H. Steuer (Max-Planck Inst. fuer Plasmaphysik, Garching, West Germany) Dec. 1981 13 p refs Submitted for publication
(IPF-81-13) Avail: NTIS HC A02/MF A01

A periodically pulsed Thomson scattering experiment for measuring electron density and temperature over the whole duration of a Tokamak discharge is described. An Nd:YAG laser at 1.06 microns was used in combination with Si avalanche photodiode detectors. Density calibration was done by rotational anti-Stokes Raman scattering from hydrogen. The system measures electron densities down to 2 times 10 to the 12th power/cucm. Results for the time evolution of electron density and temperature throughout a normal and a long pulse - low density discharge show that the system is suitable for fusion device diagnostics. Author (ESA)

N82-29200# Fom-Instituut voor Plasmafysica, Rijnhuizen (Netherlands).

EXPERIMENTAL STUDIES OF ANOMALOUS PLASMA HEATING IN TORTUR 2

A. W. Kolfschoten Mar. 1982 46 p refs Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (ZWO)
(Rept-82-141) Avail: NTIS HC A03/MF A01

In order to study the effect of turbulent current pulses in well confined high temperature plasmas, steeply-rising pulses with a high electric field were applied to the Tokamak discharge. The Thomson scattering and soft X-ray detector systems are described. Strong ion heating associated with a destabilization of electrostatic ion-cyclotron waves by the drifting electrons in the isothermal plasma takes place. The energy fed into the ions is roughly equal to the energy lost from the drift motion. The current pulses also result in electron heating at the outer zones of the plasma, probably due to excited ion-sound waves, which preferentially heat the electrons. Additional electron heating at the center is not observed. Author (ESA)

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

N82-29201# IBM Watson Research Center, Yorktown Heights, N.Y.

STUDY OF THE PHYSICS OF INSULATING FILMS AS RELATED TO THE RELIABILITY OF METAL OXIDE SEMICONDUCTOR (MOS) DEVICES Semiannual Technical Report, 1 Jun. - 30 Nov. 1981

J. A. Calise, K. M. DeMeyer, D. J. DiMaria, D. W. Dong, L. M. Ephrath, C. Falcony, C. R. Guarnieri, S. K. Lai, F. L. Pesavento, and D. R. Young Feb. 1982 121 p refs
(Contract MDA903-81-C-0100; ARPA Order 4012)
(AD-A112501) Avail: NTIS HC A06/MF A01 CSCL 20/12

This report covers work on enhanced electron injection into SiO2, studies of limitations on the number of useful write/erase cycles for EAROS devices due to electron trapping in the SiO2, the physics and design of EAROS devices using Si-rich SiO2 charge injectors, and the capture and release of electrons on Na(+)-related sites in SiO2. An automatic system is described for making write/erase cycling measurements of EAROS devices. Author (GRA)

N82-29202# Westinghouse Research and Development Center, Pittsburgh, Pa.

PREPARATION OF LARGE-DIAMETER GaAs CRYSTALS Annual Report, Jun. 1980 - Jun. 1981

H. M. Hobgood, T. T. Braggins, D. L. Barrett, G. W. Eldridge, and R. N. Thomas 18 Sep. 1981 125 p refs
(Contract N00014-80-C-0445; NR Proj. 243-030)
(AD-A107395; REPT-81-9F7-BOULF-R5; AR-1) Avail: NTIS HC A06/MF A01 CSCL 20/2

Significant progress has been made toward developing large-diameter, semi-insulating GaAs crystals of improved quality by LEC growth for direct ion implantation. The intent has been to (1) develop a reproducible twin-free growth technique for large-diameter 50-mm and 75-mm GaAs crystals; (2) achieve stable, semi-insulating substrate properties without resorting to intentional doping with chromium (or at least to reduce the Cr content significantly) to avoid the serious redistribution problems associated with this impurity; (3) obtain uniform, predictable doping characteristics by direct 29Si implantation; and (4) demonstrate that uniform, round cross-section slices suitable for low-cost IC processing can be fabricated from LEC crystals. GRA

N82-29203# Oregon Graduate Center for Study and Research, Beaverton.

RARE EARTH BORIDE ELECTRON EMITTER MATERIALS FABRICATION AND EVALUATION Final Technial Report, 10 Jul. 1980 - 9 Jul. 1981

Lynwood W. Swanson, Paul R. Davis, and Mark A. Gesley Griffiss AFB, N.Y. RADC Mar. 1982 133 p refs
(Contract F19628-80-C-0117; AF Proj. 2306)
(AD-A113807; RADC-TR-82-12) Avail: NTIS HC A07/MF A01 CSCL 20/2

Techniques were developed for routine preparation of single crystal rods of LaB6, CeB6 and PrB6 by arc float zone refining. Single crystal, oriented samples were prepared from these rods and mounted as cathodes for testing. Several mounting systems were used, and flat, pointed cone and truncated cone thermionic cathodes were studied. Pointed field emitters of LaB6(100) were also investigated. Variation of thermionic emitted current density and thermal stability of materials were studied as functions of rare earth element, bulk stoichiometry and crystal orientation. Life tests were performed on several different LaB6(100) cathodes. One such cathode operated for over 3000 hours at approximately 10 A/sq cm emitted current density with no serious physical degradation. Surface properties of the materials were investigated by various surface analysis techniques. Author (GRA)

N82-29204# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Snow and Ice Branch.

CHARGED DISLOCATION IN ICE. 2: CONTRIBUTION OF DIELECTRIC RELAXATION

Kazuhiko Itagaki Mar. 1982 21 p refs
(DA Proj. 4A1-61102-AT-24)
(AD-A113936; CRREL-82-7) Avail: NTIS HC A02/MF A01 CSCL 20/12

The contribution of electrically charged dislocation motion

to dielectric relaxation was studied theoretically. Experimentally obtained data on charge density, dislocation density, and segment length and distribution were used to calculate dielectric relaxation as well as the distribution of spectra. Author

N82-29205# Michigan Univ., Ann Arbor. School of Public Health.
PROPERTIES OF THREE-DIMENSIONAL ENERGETIC SOLIDS AND MOLECULAR CRYSTALS Annual Technical Report, 1 Jul. 1981 - 1 Apr. 1982
A. Barry Kunz 1 Apr. 1982 11 p refs Prepared in cooperation with Illinois Univ. at Urbana-Champaign, Urbana
(Contract N00014-81-K-0620; Grant NSF DMB-80-20250; NR Proj. 394-503)
(AD-A113764; ATR-1) Avail: NTIS HC A02/MF A01 CSCL 20/2

This study is a theoretical investigation of the wide range of phenomena exhibited by energetic materials in their solid phase and other prototypic molecular crystals. Very little is known about the electronic structure of this class of materials, and this is especially true under conditions of extreme temperature and pressure. Two complementary ab initio techniques based on the Hartree-Fock model have been undertaken to elucidate the electronic structure: energy band theory which uses the translational invariance of the solid, and finite molecular cluster modeling which probes local phenomena. The initial coding for bulk and surface energy band calculations using the linear combination of molecular orbitals approach has been implemented and tested. Currently the final stages of the calculation are being debugged. This is made difficult by the complicated rotational properties of the molecular basis vectors and the lack of a benchwork energy band calculation for molecular solids. Molecular methane has been studied using the cluster model. Computations employing many body perturbation theory have been concluded on the ground and excited state including the Jahn-Teller effect. A bulk solid simulating cluster of thirteen methane molecular units has been employed to study the ground state properties. The excited state is presently being explored. Author (GRA)

N82-29206# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Hochfrequenztechnik.
DEVELOPMENT OF A SURFACE TECHNOLOGY FOR GaAs DEVICES Final Technical Report, Jan. - Dec. 1981
H. L. Hartnagel, E. Huber, K. Roehkel, and W. Schmolla Dec. 1981 87 p refs
(Contract DAJA37-81-M-0038; DA Proj. 1T1-61102-BH-57)
(AD-A112913) Avail: NTIS HC A05/MF A01 CSCL 20/12

The method of two-step anodisation was investigated further. It was found that inversion-type capacitance increases can also be obtained occasionally by anodizing an Al film only on GaAs. Light emission studies have shown that the emission efficiency depends on the quality of the interface layer. Pulsed-laser experiments for the generation and excitation of electron-hole pairs have demonstrated the importance of charge trapping in an interface region extending more than 100 A into the oxide. Author (GRA)

N82-29207# Hughes Research Labs., Malibu, Calif.
LIQUID CRYSTAL MATERIALS FOR MATRIX DISPLAYS Final Report, 15 Jan. 1981 - 15 Jan. 1982
J. David Margerum and Anna M. Lackner Apr. 1982 41 p refs
(Contract N00014-81-C-0307; NR Proj. 359-713)
(AD-A114444) Avail: NTIS HC A03/MF A01 CSCL 14/2

Liquid crystal (LC) and display cell materials were studied. Thermal degradation of ester LCs was accelerated by soft glass surfaces, which increase hydrolysis type reactions. Pyrex, quartz, and coatings such as SiO2, Si3N4, indium tin oxide (ITO), and polyvinyl alcohol (PVA) on soft glass gave less thermal degradation at 100 C than uncoated float glass or drawn glass. Hermetically sealed cells were necessary for long term thermal stability of ester LCs. Long term LC stability was observed at 100 C in sealed cells with ITO/PVA coatings on float glass. However, the epoxy type sealants previously used introduced harmful conductivity impurities into the LCs at elevated temeratures. These caused very limited dc lifetime, even at only 55 C and in the presence of redox dopants. An ultraviolet cured optical cement was found to be a much better sealant; at 100 C it introduced two orders of magnitude fewer conductive impurities into ester LCs and caused less surface alignment changes than epoxy sealants. Studies on new ester LC mixtures with relatively low viscosity showed excellent dc-DS characteristics. Author

N82-29208# Cornell Univ., Ithaca, N. Y. Dept. of Materials Science and Engineering.
CONTROLLED GRAIN BOUNDARY STRUCTURES IN SUPERCONDUCTORS Final Report, 1 Jan. 1977 - 31 Dec. 1981
Edward J. Kramer Mar. 1982 15 p refs
(Grant AF-AFOSR-3107-77; AF Proj. 2306)
(AD-A114243; AFOSR-82-0330TR) Avail: NTIS HC A02/MF A01 CSCL 20/12

The concept of the specific pinning force Q and the development of new methods to sum elementary interaction forces to find Q are discussed. Pinning due to changes in transition temperature or thermodynamic critical field in thin layers (e.g., a grain boundary) is greatly reduced due to the proximity effect. The stress field interaction due to the dislocations in the grain boundary is shown to be negligible. The crystalline anisotropy (CA) and electron scattering (ES) interactions were computed for the first time for an arbitrary boundary. Experiments on niobium bicrystals, polycrystalline niobium thin foils doped with oxygen, lead-bismuth alloy thin films and lead-bismuth alloy films in which either lead or thallium was allowed to diffuse down the grain boundaries and out into the grains provided evidence that confirms the predictions of the theory. These results suggest that further improvements in grain boundary pinning in the A-15 compounds, which are relatively high purity, are possible by decreasing their impurity content if that can be accomplished without decreasing their thermodynamic critical field or transition temperature. Author

N82-29209# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SOLID STATE RESEARCH Quarterly Technical Summary Report, 1 Aug. - 31 Oct. 1981
Alan L. McWhorter 15 Nov. 1981 79 p refs
(Contract F19628-80-C-0002; AF Proj. 649L)
(AD-A114189; ESD-TR-81-332) Avail: NTIS HC A05/MF A01 CSCL 20/12

This report covers in detail the solid state research work of the Solid State Division at Lincoln Laboratory. The topics covered are Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, and Analog Device Technology. Funding is primarily provided by the Air Force, with additional support provided by the Army, DARPA, Navy, NASA, and DOE. GRA

N82-29210# Ames Lab., Iowa.
CRYSTAL AND MOLECULAR STRUCTURES OF SELECTED ORGANIC AND ORGANOMETALLIC COMPOUNDS AND AN ALGORITHM FOR EMPIRICAL ABSORPTION CORRECTION Ph.D. Thesis
Barbara Ann Karcher Oct. 1981 111 p refs
(Contract W-7405-eng-82)
(DE82-005451; IS-T-967) Avail: NTIS HC A06/MF A01

The compound Cr(CO)5(SCMe2) crystallizes in the monoclinic space group P2 sub 1/a with a = 10.468(8), b = 11.879(5), c = 9.575(6) A, and beta = 108.14(9) deg, with an octahedral coordination around the chromium atom. The compound PSN3C6H12 crystallizes in the monoclinic space group P2 sub 1/n with a = 10.896(1), b = 11.443(1), c = 7.28(1) A, and beta = 104.45(1) deg. Each of the five membered rings in this structure contains a carbon atom which is puckered toward the sulfur and out of the nearly planar arrays of the remaining ring atoms. The compound (ThO4N4C48H56) (+) (BC24H20) (-).1.5NC2H3 crystallizes in a triclinic space group P1 with a = 17.355(8), b = 21.135(10), c = 10.757(5) A, alpha complex is a monomer MoP2o10C16H22 crystallizes in the monoclinic space group P2 sub 1/c with a = 12.220(3), b = 0.063(2), c = 20.150(6) A, and beta 103.01(3) deg. The molybdenum atom occupies the axial position of the six membered ring of each of the two phosphorinane ligands. An empirical absorption correction program was written. DOE

N82-29211# Paris XI Univ., Orsay (France). Inst. de Physique Nucleaire.

SEARCH FOR SUPERCONDUCTIVITY IN ION-IMPLANTED b-Ge FILMS

F. C. Zawislak (Inst., de Fisica, UFRGS, Porto Alegre, Brazil), H. Bernas, L. Mendoza-Zelis (Univ. de La Plata), A. Travers, J. Chaumont (Lab. Rene Bernas, Orsay), and L. Dumoulin (Lab. de Physique des Solides, Orsay) 1980 14 p refs Sponsored in part by Consejo Nacional de Investigaciones Cientificas y Tecnicas de la Republica Argentina

(IPNO-PhN-80-22) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

The dose and the temperature dependence of the resistivity in thin coevaporated films (500-600 A) of Pb sub 0.3 Ge sub 0.7 and Pb sub 0.7 Ge sub 0.3 implanted at 6K with up to 2x10 Ge/sq cm of 90 and 140 KeV were investigated. The composition and uniformity of the films were controlled via in situ Rutherford backscattering (RES) measurements, as functions of the implanted dose and the annealing temperature. The following results were obtained: (1) a sharp T sub c very close to the T sub c of pure Pb was measured for the Pb sub 0.7 Ge sub 0. film and no change in T sub C was observed as a function of dose; (2) for the Pb sub 0.3 Ge sub 0.7 film the T sub c decreased from about 6.8 K before implantation to about 3.5 K after implantation of 2x10 were investigated. Ions/sq cm; and (3) the RES spectra revealed that the alloy homogeneity was larger after implantation at 6 K than before implantation and that precipitation for Pb occurred during annealing. DOE

N82-29212# Oak Ridge Y-12 Plant, Tenn. Chemical Processes Dept.

INITIAL STAGES OF OXIDATION ON SINGLE CRYSTALS OF LITHIUM HYDRIDE INTERACTION BETWEEN SINGLE CRYSTAL LITHIUM HYDRIDE AND A STAINLESS STEEL, HIGH VACUUM CONTAINER

R. F. Simandl and J. F. McLaughlin 30 Nov. 1981 40 p refs (Contract W-7405-eng-26)

(DE82-005614; Y-2256) Avail: NTIS HC A03/MF A01

Interaction between single crystals of lithium hydride (LiH) and surface contaminants found on clean stainless steel and gold plated stainless steel containers during a high vacuum, 350 anneal contributed significantly to the oxidation of the single crystal surfaces. Annealing the samples in the presence of a clean, polycrystalline LiH getter in a hydrogen reduced container significantly reduced surface oxidation. Thermal etching during the 350 C anneal under high vacuum contributed to the formation of a very unusual maze morphology and also to a rectangular step morphology. DOE

N82-29213# Xerox Corp., Palo Alto, Calif.

STRUCTURAL AND ELECTRONIC STUDIES OF DEFECTS IN AMORPHOUS SILICON Technical Progress Report, Aug. - Oct. 1981

R. A. Street, D. K. Biegelson, and J. Zesch 15 Nov. 1981 14 p refs

(Contract DE-AC02-77CH-00178)

(DE82-004477; SERI/PR-9079-1-T5; Rept-2) Avail: NTIS HC A02/MF A01

A series of measurements of spin dependent luminescence was performed on undoped a-Si:H to obtain information about the recombination processes. Changes in the luminescence intensity as the sample is brought into magnetic resonance are observed. The effect was studied in samples deposited under different deposition conditions and containing different defect densities. It is shown that the effect is due to nonradiative recombination at unthermalized spins. It is concluded that the recombination process is the capture of a conduction band electron into a dangling bond. DOE

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

N82-29214# Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.

SCHROEDINGER EQUATION IN THE QUANTIM FIELD THEORY WITH NONLOCAL

G. V. Efimov and Kh. Namsrai 1980 16 p refs In ENGLISH; RUSSIAN summary Submitted for publication

(JINR-E2-80-705) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

It is shown that the finite and unitary S-matrix describing nonlocal interactions of quantized fields is a solution of the Cauchy problem for the evolution equation (the Schroedinger equation in the interactin picture at imaginary time, i.e., with the Euclidean metric) with retardation. In this case, supplementary degrees of freedom with respect to the Fock need not be introduced in representation of physical articles. T.M.

N82-29215# Minnesota Univ., Minneapolis. School of Physics and Astronomy.

EXPERIMENTAL STUDY OF THE THERMODYNAMICS OF THIN FILMS AND SURFACES Progress Report, 1981

E. D. Dahlberg and A. M. Goldman Nov. 1981 10 p refs (Contract DE-AC02-81ER-10887)

(DE82-004887; DOE/ER-10887/1) Avail: NTIS HC A02/MF A01

Semiconductor membrane calorimeters were developed to investigate thermodynamic properties of thin films and surfaces using ac calorimetry. The membranes are formed using directional and selective etching techniques on Si wafers. The procedures developed to form calorimeters and to affix heaters, thermometers and electrical leads are a generalization of those used to fabricate Si membrane Josephson junctions. DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N82-29216* National Aeronautics and Space Administration, Washington, D. C.

NASA REPORT TO EDUCATORS, VOLUME 10, NO. 1

Muriel E. Thorne, ed. 1982 7 p refs

Avail: SOD CSCL 05B

A motion study of insects in flight is reported. Nine OSS experiments are described: the plasma diagnostic package, Shuttle-Spacelab induced atmosphere, vehicle charging and potential experiment, microbrasion foil, contamination monitor package, thermal canister, solar flare X-ray polarimeter, solar ultraviolet spectral irradiance monitor, and plant growth into. Four other experiments are also described: electrophonesis equipment verifization, Heflex bioengineering, getaway special, and monodisperse latex reactor. Pioneer 10 is discussed. The Urban Community enrichment and CLASS programs are also discussed. Other educators' support services are described. N.W.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N82-29217*# Bowie State Coll., Md.

AUTONOMOUS SCHEDULING TECHNOLOGY FOR EARTH ORBITAL MISSIONS

Sadananad Srivastava [1982] 67 p refs

(Grant NGR-21-027-004)
(NASA-CR-168939; NAS 1.26:168939) Avail: NTIS HC A04/MF A01 CSCL 05A

The development of a dynamic autonomous system (DYASS) of resources for the mission support of near-Earth NASA spacecraft is discussed and the current NASA space data system is described from a functional perspective. The future (late 80's and early 90's) NASA space data system is discussed. The DYASS concept, the autonomous process control, and the NASA space data system are introduced. Scheduling and related disciplines are surveyed. DYASS as a scheduling problem is also discussed. Artificial intelligence and knowledge representation is considered as well as the NUDGE system and the I-Space system. Author

N82-29218# Meridian Corp., Falls Church, Va.
PRELIMINARY ANALYSIS OF TECHNICAL RISK AND COST UNCERTAINTY IN SELECTED DARPA PROGRAMS Final Report
6 Oct. 1981 37 p
(Contract MDA903-81-C-0375; DARPA Order 4287)
(AD-A107402) Avail: NTIS HC A03/MF A01 CSCL 05/1

This report documents the analytical results and conclusions of a four-month investigation of cost and uncertainty in selected DARPA programs. The analysis focuses on risk and the management of risk from a technical, cost, and schedule perspective through a comparison of DARPA experience to a large experience base of other federal programs. The results indicate that DARPA experience in the management of high technology programs can be interpreted (and to some degree of accuracy, forecasted) using this experience base. In addition, this analytical and empirical approach can be used to assist DARPA in complying with recent DOD directives to recognize risk in budgeting and planning estimates. Most importantly, the study effort demonstrates that it is possible to identify qualitative indicators to characterize risk and to use such descriptors as the basis for risk management. GRA

N82-29219# RAND Corp., Santa Monica, Calif.
PLANNERS' WORKBENCH: A COMPUTER AID TO THE RE-PLANNING
Barbara Hayes-Roth, Frederick Hayes-Roth, Norman Shapiro, and Keith Wescourt Oct. 1981 33 p refs
(AD-A113331; AD-E750422; RAND/P-6688) Avail: NTIS HC A03/MF A01 CSCL 05/1

This paper reports the current status of a computer aid to re-planning, the PLANNERS' WORKBENCH. Current organizational planning methods support the generation of large, complex configurations of planned activities. However, they do not provide mechanisms for modifying plans in the face of changed assumptions or new environmental conditions. The PLANNERS' WORKBENCH would fill this need by recording the considerations made during plan generation--the plan rationale--and providing facilities for exploiting the rationale during re-planning. Author (GRA)

N82-29220# Defense Systems Management School, Fort Belvoir, Va.
CONCEPTS, THE JOURNAL OF DEFENSE SYSTEMS ACQUISITION MANAGEMENT, AUTUMN 1981, VOLUME 4, NUMBER 4
1981 125 p refs
(AD-A113130) Avail: NTIS HC A06/MF A01 CSCL 05/1

Contents: Financing Defense System Programs; Evaluating the Impact of Quantity, Rate, and Competition; Department of Defense Acquisition Improvement Program; Human Factors in Weapon Design: The Performance Gap; Systems Approach to Multinational Acquisition (NATO AWACS); Scheduling for Program Management: How and Why; and Defense Systems Management Review/Concepts Index. GRA

N82-29221# Doty Associates, Rockville, Md.
STUDY OF INCREASING LEAD TIMES IN MAJOR WEAPON SYSTEMS ACQUISITION Final Technical Report, 15 Jul. 1980 - 31 Jul. 1981
William B. Humphrey, Robert B. Ladd, and John N. Postak 31 Jul. 1982 235 p refs
(Contract MDA903-80-C-0519)
(AD-A113459; DAI-TR-254) Avail: NTIS HC A11/MF A01 CSCL 15/5

This study analyzed the problems of increasing lead times that have been experienced in the acqusition of major weapon systems during the past decade. Items that have been significantly increasing lead time were identified and classified. In cases where sufficient lead time data was available, trend analysis was conducted. Causes of increasing lead times were identified and assessed. Based on the above effort, alternative courses of action were developed which have potential for alleviating increasing lead times. Alternatives were categorized and evaluated for feasibility of implementation by Program Managers, DoD, Congress and other government departments, and industry. GRA

N82-29222# Booz-Allen and Hamilton, Inc., Bethesda, Md.
CASE STUDIES OF INNOVATION IN R AND D PLANNING Final Report
C. L. Rust and J. J. McCambridge Dec. 1981 111 p refs Sponsored by Electric Power Research Inst.
(EPRI Proj. 1432-2)
(DE82-901277; EPRI-EA-2154) Avail: NTIS HC A06/MF A01

Four organizations were selected as case studies to illustrate innovative approaches to R and D planning. The highlights of their planning systems are described. Comparisons of the four R and D planning systems revealed strong similarities, despite significant differences, in procedural or analytical specifics and management emphasis. Successful R and D planning systems possess three important characteristics founded upon (1) clear cut, hierarchial statements of technical objectives; (2) use of quantitative and qualitative criteria to measure the fit of R and D projects to technical objectives; (3) rely on management judgment for resource allocation decisions. Some form of variable and zero phase budgeting procedure to evaluate merits of programs/projects at different funding levels while focusing on a small set of efforts at the margin is adopted. DOE

N82-29223# Sandia Labs., Albuquerque, N. Mex. Energy Research and Development Support Div.
REALISTIC APPROACH TO THE PLANNING OF HIGH TECHNOLOGY, HIGH RISK PROJECTS
Marvin J. Becktell Sep. 1981 14 p refs
(Contract DE-AC04-76DP-00789)
(DE82-001049; SAND-79-1483-Rev) Avail: NTIS HC A02/MF A01

The historical development of project planning techniques is reviewed and realistic planning techniques identified. Network analysis methods are described. Realistic planning techniques which identify resources, priorities, interrelationsips, and goals are outlined. Planning and scheduling, time estimates, updating, objectivity, and performance evaluation are considered. DOE

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software*.

N82-29224# RAND Corp., Santa Monica, Calif.
IMPLEMENTATION OF INFORMATION TECHNOLOGY IN OFFICE SETTINGS: REVIEW OF RELEVANT LITERATURE
Tora K. Bikson, Barbara A. Gutek, and Don A. Mankin Nov. 1981 50 p refs *Its* Rand Paper Series
(RAND-P-6697) Avail: NTIS HC A03/MF A01

The introduction of computerized procedures into office settings is investigated. Specifically, this undertaking suggest hypotheses about classes of variables that are likely to affect short and long run outcomes of the implementation of information technology in work contexts, and provide a framework for examining that process. For this purpose office information technology is regarded as comprising multifunction computer systems that perform some of the information handling tasks of the work unit in interaction with their users; they encompass a number of autonomous part whose tasks can be executed in

parallel. This definition distinguishes the systems thought to typify the office of the future from closely related technologies that are single function and/or noninteractive (e.g., voice message systems, typewriters with memories, computerized payroll processing, and other already widely diffused technologies). S.L.

N82-29225*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SCIENTIFIC AND TECHNICAL INFORMATION OUTPUT OF THE LANGLEY RESEARCH CENTER FOR CALENDER YEAR 1981
Jun. 1982 235 p
(NASA-TM-83270; NAS 1.15:83270) Avail: NTIS HC A11/MF A01 CSCL 05B

Included are citations for formal reports, quick-release technical memorandums, contractor reports, journal articles and periodical literature, meeting/conference papers, and computer programs. Tech briefs, patents, and oral presentations to conferences/workshops are also included. T.M.

N82-29226# Naval Oceanographic Office, Bay St. Louis, Miss.
ENVIRONMENTAL FILES AND DATA BASES. PART A: INTRODUCTION AND OCEANOGRAPHIC MANAGEMENT INFORMATION SYSTEM Final Report
Carl W. Miller, ed. Sep. 1981 104 p
(AD-A113687; NOO-RP-36) Avail: NTIS HC A06/MF A01 CSCL 05/2

'Environmental Files and Data Bases' provides information about the environmental data holdings of the U.S. Naval Oceanographic Office. The chapters contain descriptions and summaries of the Oceanographic Management Information System's services, acoustic, bathymetric, geomagnetic, gravimetric, hydrographic, marine geological, physical oceanographic, climatological, biological, and other types of data of significance to producers of data and data products. A loose-leaf format allows updating of separate chapter units, when appropriate. GRA

N82-29227# National Academy of Sciences - National Research Council, Washington, D. C. Numerical Data Advisory Board.
REPORT OF AD HOC NDAB SUBGROUP
1 Mar. 1982 10 p ref
(Contract NB80-NADA-1036)
(AD-A112955) Avail: NTIS HC A02/MF A01 CSCL 05/2

This report is the result of a request made by Hubert Sauter, Administrator, Defense Technical Information Center (DTIC), and is based on (1) a presentation by Sauter and DoD staff at the Numerical Data Advisory Board (NDAB) meeting of 13-14 July 1981, and (2) a follow-up meeting on 31 July at DTIC in response to discussions at the NDAB meeting. The intent of these meetings was to initiate discussions and provide a preliminary transmittal to DTIC, which is seeking NDAB advice in establishing a more numerically oriented program. Therefore, this report covers only some of the most significant points for DTIC consideration. It identifies a number of broad, long-range data issues as well as specific tasks that require immediate attention. It makes recommendations in those areas of highest priority that should be addressed even in the event of reduced budget. Some of these may result in cost saving. Other subjects identified in this report should be addressed to the extent that a less constrained budget may allow. DTIC must anticipate increased computer sophistication, automated methods in design and manufacturing, improved understanding of artificial intelligence capabilities, and as yet unprecedented pathways of numerical data from laboratory of origin to end user. Development of forefront data/information utilization and transfer methods is pre-requisite for development of high defense technology. GRA

N82-29228# Stanford Univ., Calif. Dept. of Computer Science.
SEPARABILITY AS A PHYSICAL DATABASE DESIGN METHODOLOGY
Kyu-Young Whang, Gio Wiederhold, and Daniel Sagalowicz (SRI International, Menlo Park, Calif.) 17 Jan. 1982 61 p refs
(AD-A114138; SU-STAN-CS-81-898; CSL-TR-222) Avail: NTIS HC A04/MF A01 CSCL 09/2

The issues involved in designing the access configuration of a physical data base so as to minimize the number of disk accesses for queries and updates are discussed. Author

N82-29229# Department of Energy, Oak Ridge, Tenn. Technical Information Center.
ENERGY DATA BASE: SUBJECT THESAURUS PERMUTATED LISTING
Oct. 1981 240 p
(DE82-005770; DOE/TIC-7000/R5-App) Avail: NTIS HC A11/MF A01

Entry to a large multidisciplinary thesaurus containing both single and multiword descriptors presents problems to the experienced as well as the new user. This permutated listing was prepared to alleviate these problems. Each descriptor was permutated according to each significant word in single and multiword entries and listed alphabetically. This type listing provides the user with the correct thesaurus entry and permits review of generically related descriptors separated by alphabetization in the Thesaurus. DOE

N82-29230# National Bureau of Standards, Washington, D.C.
DIMENSIONS/NBS, VOLUME 65, NUMBER 7, SEPTEMBER 1981 Monthly Report, Sep. 1981
Sep. 1981 29 p refs
(PB82-158692; NBS-DIM-65-7) Avail: NTIS HC A03/MF A01 CSCL 05B

Major technical developments, highlights of work in progress, major speeches and statements and a listing are summarized. The tables of contents includes: listening to the stars; NBS inventors are honored charting the world of radiography; fracture mechanics research aims at lowering construction costs; new source for testing neutron dosimeters; molecular processes affecting durability of polymers studied; neomycin B studied, SERS used to study molecular interactions; new Gamma-ray SRM's have greater liftetimes. GRA

N82-29231# American Univ., Washington, D. C. Inst. for Applied Public Financial Management.
REQUIREMENTS AND ALTERNATIVES FOR A MANAGEMENT INFORMATION SYSTEM TO SUPPORT HAZARDOUS WASTE ENFORCEMENT Final Report
Elizabeth C. Hussain Dec. 1981 99 p refs Sponsored by EPA
(PB82-154410; Rept-162-81-7) Avail: NTIS HC A05/MF A01 CSCL 13B

The hazardous waste program does not have an information system that can handle the enforcement program. The requirements for such an information system and possible alternatives for different systems to handle the enforcement job are discussed. Various constraints on the systems are also discussed. Author

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N82-29232# Army Troop Support Command, St. Louis, Mo. Comptroller Cost Analysis Div.
HISTORICAL INFLATION PROGRAM. A COMPUTER PROGRAM GENERATING HISTORICAL INFLATION INDICES FOR ARMY AIRCRAFT Final Report
Warren H. Gille, Jr. Mar. 1982 82 p refs
(AD-A114053; TSARCOM-TR-82-2) Avail: NTIS HC A05/MF A01 CSCL 05/3

This report extends and revises Technical Report 81-1 which presents and describes the Historical Inflation Program, a computer program generating historical inflation indices for Army aircraft. The program can be updated monthly, is easily revised for changes in Bureau of Labor Statistics methods, and is capable of handling data for all fiscal year formats. Output is expressed as monthly, quarterly, Fiscal Year, and Calendar Year inflation indices (in Calendar Year 1967 base) and inflation factors (in any Fiscal Year base). This report contains updated tables of inflation factors, expressed in a FY 81 base. These indices and factors provide a

means of adjusting historical cost data for the procurement of Army aircraft to constant year dollars. Additional features include: computations for the Derivation of Revised Weighting Factors, detailed indices enabling the adjustment of historical Labor and Material cost separately, a discussion of aggregate weighting factors for Labor and Materials, (including trends from sensitivity analysis with more background materials), and additional documentation aimed at making the report useful to a large cross section of the DOD/Rotary Wing Aircraft Community.GRA

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N82-29233# Committee on Commerce, Science, and Transportation (U. S. Senate).
NASA AUTHORIZATION FOR FISCAL YEAR 1983
Washington GPO 1982 615 p refs Hearings before the Subcomm. on Sci., Technol., and Space of the Comm. on Com., Sci. and Transportation, 97th Congr., 2d Sess., 23, 25 Feb., 16, 18, 30 Mar., 1 Apr. 1982
(GPO-91-557) Avail: Subcommitee on Science, Technology and Space

Emphasis is given to programs of the Space Transportation System toward an operational status and the balance between basic science, space applications, aeronautics, and space technology. The civilian and defense sectors are also examined. N.W.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N82-29234# Comptroller General of the United States, Washington, D.C.
ELECTRIC VEHICLES: LIMITED RANGE AND HIGH COSTS HAMPER COMMERCIALIZATION
19 Mar. 1982 46 p refs
(EMD-82-38) Avail: NTIS HC A03/MF A01

The state of electric vehicle development is discussed. The readiness and capability of the major automakers to develop and commercialize electric vehicles was assessed. The success of Federal efforts to advance their commercial readiness is also discusseed. S.L.

N82-29235*# *Mechanical Technology, Inc., Latham, N. Y. Stirling Engine Systems Div.*
AUTOMOTIVE STIRLING ENGINE DEVELOPMENT PROGRAM *Quarterly Technical Progress Report, 1 Apr. - 30 Jun. 1981*
Steven Piller, Al Richey, Mark Dowdy, and Kelly Mather May 1982 111 p refs
(Contracts DEN3-32; EC-77-A-31-10040)
(NASA-CR-167907; DOE/NASA/0032-15; NAS 1.26:167907; MTI-91ASE229QT13) Avail: NTIS HC A06/MF A01 CSCL 13F

The background and history of the Stirling engine, the technology, materials, components, controls, and systems, and a technical assessment of automotive stirling engines are presented. Author

N82-29236# New Zealand Energy Research and Development Committee, Auckland.
FEASIBILITY OF ELECTRIC VEHICLES IN NEW ZEALAND. APPENDICES Progress Report
J. Noble May 1981 71 p Prepared in cooperation with the Liquid Fuels Trust Board, Wellington, New Zealand
(DE82-901431; NZERDC-LF-2009-App; R-61; ISSN-0110-1692; ISSN-0110-1191) (US Sales Only) HC A04/MF A01; DOE Depository Libraries

The feasibility of electric vehicles in New Zealand was reported. The 13 appendices are on the following subjects: hybrid electric vehicles, trolley buses, electric vehicle drive systems, separately excited dc motor efficiency tests, ac motor efficiency test, driving tests - NEEV vehicle, dynamometer tests - NEEV Vehicle, performance variations with differing parameters, questionnaire on vehicle use and performance, vehicle drive cycles, drive pattern report, national benefit analysis, and summary of review comments. DOE

N82-29237# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Information und Dokumentation.
THE TRANSRAPID TEST SYSTEM IN EMSLAND
Erich Eitlhuber 1981 9 p refs Reprint from ETR-Eisenbahntech. Rundschau, (West Germany) v. 6, 1980 p 3-7 In GERMAN; ENGLISH summary
(MBB-543/81-O) Avail: Issuing Activity

Goals, requirements, and design of the Transrapid test system are described. Application oriented investigation of magnetic levitation railroad technology is outlined. The Emsland demonstration train is 54 m long and can carry up to 196 passengers. It runs on a 31.5 km line and attains speeds of 400 km/hr. The railway wagon and overhead, monorail guideway design are shown. Certification testing is planned for 1982. Author (ESA)

N82-29238# Chi Associates, Inc., Arlington, Va.
SLURRY WALLS AS AN INTEGRAL PART OF UNDERGROUND TRANSPORTATION STRUCTURES Final Report, Sep. 1978 - Nov. 1980
M. Chi, B. Dennis, and M. Basci Nov. 1981 175 p (Contract DOT-FH-11-9505)
(PB82-145061; FHWA/RD-80/047) Avail: NTIS HC A08/MF A01 CSCL 13B

A summary of advantages, disadvantages, and design problems most often encountered with slurry walls is presented. Design alternatives and solutions to common problems are developed. Parametric studies allow easy comparison of various design approaches for underground transportation structures. New design concepts are presented which take advantage of station geometry and material properties. An alternate design is developed using the new concepts and compared with an existing subway station in Washington, D.C. In a cost comparison between the alternate designs, it is shown that integrating slurry wall as a part of the permament structure could have resulted in a $2 million savings. This is in addition to the savings already realized through the use of surry wall as temporary earth support during the excavation, in lieu of the flexible system. Thus, the potential combined savings attributable to the adaptation of slurry walls in the overall project would be quite significant. GRA

N82-29239# Texas Transportation Inst., College Station.
TRAFFIC CAPACITY THROUGH WORK ZONES ON URBAN FREEWAYS Interim Report, Sep. 1977 - Apr. 1981
Conrad L. Dudek and Stephen H. Richards Apr. 1981 34 p refs Sponsored by Federal Highway Administration and Texas State Dept. of Highways and Public Transportation
(PB82-143009; TTI-2-18-78-228-6; FHWA/TX-81/28-223-6) Avail: NTIS HC A03/MF A01 CSCL 13B

Findings of capacity studies conducted at urban freeway maintenance and construction work zones in Houston and Dallas are summarized. Studies were conducted on 5-, 4-, and 3-lane freeway sections. The results indicate that the per lane capacities are affected by the number of lanes open during the roadwork. For example, the average capacity on a 3 lane section with 2 lanes open was 1500 vphpl; while the average capacity with 1 lane open was only 1130 vphpl. It is also illustrated how the data can be used to estimate the effects of the lane closures in terms of queue length, and thus can be applied to work scheduling. GRA

N82-29240# Texas Transportation Inst., College Station.
SIGHT DISTANCE REQUIREMENTS AT LANE CLOSURE WORK ZONES ON URBAN FREEWAYS Interim Report,

Sep. 1977 - Apr. 1981
Stephen H. Richards and Conrad L. Dudek Apr. 1981 31 p ref Sponsored by Federal Highway Administration
(PB82-142290; TTI-2-18-78-228-7; FHWA/TX-81/29-228-7) Avail: NTIS HC A03/MF A01 CSCL 13B

The effects of sight distance to lane closures at urban freeway work zones was evaluated. The interaction of sight distance with traffic volume and various work zone traffic control features (e.g., advance signing and arrowboards was investigated. The studies were conducted at 16 maintenance work zones of freeways in Houston, Dallas, Ft. Worth, San Antonio and Corpus Christi, Texas. The studies revealed that as sight distance to a lane closure decreases, more and more drivers are trapped in the closed lane at the taper area. Also, sight distance is more critical as traffic volumes increase. Based on the study findings, a minimum desirable sight distance of 1500 feet was recommended for lane closure work zones on freeways. GRA

88 SPACE SCIENCES (GENERAL)

N82-29241# Astronomische Gesellschaft, Hamburg (West Germany).
ASTRONOMICAL SOCIETY INFORMATION NUMBER 55. REPORT OF THE MEETING [MITTEILUNGEN DER ASTRONOMISCHEN GESELLSCHAFT]
1982 216 p refs In GERMAN Conf. held at Innsbruck, 15-18 Sep. 1981
(ISSN-0374-1958; Rept-55) Avail: NTIS HC A10/MF A01

Abstracts of lectures and papers on astronomy are presented. Subjects include the diameter of (51) Nemausa, line profiles of Herbig Ae, Be stars, and line splitting in HII regions. Disk accretion effects on a rotating dipole, absorption lines in the visible spectrum of the continuous central star of PN NGC 3242, and spectroscopic observations of the S DOR variable R71 are considered. Stellar winds in the association Cyg OB 2, thermodynamic properties of supernova matter, and a case of intergalactic cannibalism are discussed. Author (ESA)

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N82-29242 Science Research Council, Chilton (England). Rutherford Appleton Lab.
THE FIRST THREE YEARS OF IUE
P. M. Gondhalekar, C. Jordan, A. J. Meadows, K. Nandy, M. V. Penston, M. Pettini, M. C. W. Sandford, J. A. J. Whelan, A. J. Willis, and R. Wilson Nov. 1981 31 p refs
(RL-81-091) Copyright. Avail: Issuing Activity

Results of the IUE mission are summarized. It reports mass loss rates in winds of luminous stars that are too high to be explained by radiation pressure alone. Interaction effects between primary and compact objects in X-ray binaries are detected. Its analysis of nova Cyg 1978 chemical composition and energy is consistent with the outburst being caused by thermonuclear runaway in material accreted onto a white dwarf. It studies chromospheric effects over a wide range of spectral type and luminosity in late stars. A hot extensive halo around our galaxy is revealed. Ultraviolet spectra of BL objects and Seyfert galaxies suggest an absence of gas in the former and detailed variations in the latter. A quasar UV spectra implies that absorption is due to the halo of an intervening (unseen) galaxy. Author (ESA)

N82-29243*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
DEFINITION PHASE EFFORT OF THE SPACELAB-2 INFRARED TELESCOPE EXPERIMENT (IRT) Final Report, 12 Mar. 1980 - 31 May 1981 and Monthly Progress Report 1 Jan. - 31 Mar. 1981
Giovanni Fazio Jun. 1981 17 p
(Contract NAS5-26097)
(NASA-CR-170424; NAS 1.26:170424) Avail: NTIS HC A02/MF A01 CSCL 03A

Activities associated with a proposal for the reflight of the small helium cooled infrared telescope scheduled to make its maiden voyage on Spacelab-2 are reported. The experiments requirements document was revised and updated and an investigation development plan was prepared for the refurbishment and reflight of the telescope. The summary of a briefing held to discuss Spacelab interfaces for the proposal is included. A.R.H.

N82-29244# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
GALACTIC RADIATION BELTS
Janet G. Luhmann 15 Jan. 1982 17 p refs
(Contract F04701-81-C-0082)
(AD-A111836; TR-0082(2940-05)-1; SD-TR-81-110) Avail: NTIS HC A02/MF A01 CSCL 03/2

This report suggests that electrons trapped in a dipolar field can reproduce some of the observed distributions of emission from extended extragalactic radio sources if the electron pitch-angle distributions are sufficiently anisotropic. GRA

N82-29245# Max-Planck-Institut fuer Physik und Astrophysik, Garching (West Germany). Inst. fuer Extraterrestrische Physik.
[ACTIVITIES REPORT OF THE INSTITUTE FOR EXTRATERRESTRIAL PHYSICS] Progress Report, 1981 [TAETIGKEITSBERICHT 1981]
1981 115 p refs In GERMAN Original contains color illustrations
(MPI-PAE/Extraterr-172; ISSN-0179-699X) Avail: NTIS HC A06/MF A01

Progress in extraterrestrial physics is reported. Various topics include: particles and fields in the solar system (ionosphere and northern lights, magnetosphere and solar wind, energetic particle radiation in the magnetosphere and interplanetary space); infrared astronomy (astronomical observations, development of observation systems, theoretical work); X-ray astronomy (astronomical observations in the X-ray domain, observation systems, laboratory investigations and measurements, theoretical work); gamma astronomy (investigation of flare and burst occurrence in the gamma-ray domain, low energy gamma astronomy, high energy gamma astronomy); and laboratory spectroscopy (molecular spectroscopy in vacuum UV and in plasmas, theoretical work). Author (ESA)

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N82-29246# Chicago Univ., Ill.
NEUTRAL INTERSTELLAR GAS IN THE LOWER GALACTIC HALO
C. E. Albert [1982] 81 p refs
Avail: NTIS HC A05/MF A01

The optical interstellar absorpiton lines of Ti II, Ca II, Na I, and the 21 cm emission line of H I were observed at high resolution and high detection sensitivity toward none pairs of nearly aligned distant halo stars and foreground disk stars with well determined distances. Analysis of the column densities, velocities, and the directly determined variation of the titanium abundances with z-distance leads to a general picture of the neutral interstellar material in the lower galactic halo. Two types of gas with distinct distribution, kinematics, and abundances are found, a thick, low velocity disk (type I) extending from the plane to well beyond the thin disk of OB stars, and a high velocity, much less strongly depleted gas (type II) observed only at high z-distances, which constitutes at least 24% of the mass of the halo gas. The implications of this model for the observed neutral gas are discussed both in terms of the possible origins of the observed gas and in its comparison with quasi stellar object absorption lines. M.G.

N82-29247# Aerospace Corp., El Segundo, Calif. Laboratory Operations.
DETERMINATION OF THE INTRINSIC Q(3)/5(1) LINE INTENSITY RATIO OF MOLECULAR HYDROGEN
T. R. Geballe (Mount Wilson Observatory), R. W. Russell, and D. Nadeau (Montreal Univ.) 19 Jul. 1982 14 p refs
(ATR-82(8415)-1) Avail: NTIS HC A02/MF A01

Observations of the H2 Nu = 1 yields O S(1) and Q(3) lines in the planetary nebula NGC 7027 yield an intrinsic Q(3)/S(1) line intensity ratio of 0.74 + or - 0.08. This value is consistent with the theoretical ratio of the Einstein A coefficients of these transitions. The HI 20-5 line intensity in NGC 7027 is also reported and discussed. M.G.

N82-29248# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Raumfahrttechnik.
FUTURE SATELLITE CARRIERS [ZUKUENFTIGE SATELLITENTRAEGER]
Harry O. Ruppe Jun. 1981 41 p Repr. from ECON-Verlag (West Germany), Band 2, Jan. 1982 In GERMAN
(TUM-LRT-TB-81/6) Avail: NTIS HC A03/MF A01

The procedure of choosing the best solution for a space carrier rocket for the 90's is depicted. The aim is the deposition of nuclear wastes in space. All rockets have a nominal weight of 1000 t. One and two stage rockets were studied. The equipment may be lost during each flight or partially or fully reused. All technical and cost requirements were investigated and the results are tabulated for the different choices. Author (ESA)

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N82-29249 Academy of Sciences (USSR), Moscow. Space Research Inst.
ON THE NATURE OF MAGNETIC FIELDS IN THE VICINITY OF MARS
E. M. Dubinin, I. M. Podgorny, P. L. Israelevich, and S. Shkolnikova 1981 16 p refs
(Rept-672) Copyright. Avail: Issuing Activity

Analysis of magnetic field measurements on board the Mars-3 and Mars-5 stations carried out in the coordinate system the axes of which are determined by the interplanetary magnetic field direction show that in the vicinity of Mars a region exists where there is no correlation between the direction of the measured magnetic field and that of the IMF transverse component. The field in this region can not be explained by draping the obstacle envelopment by the field lines, it is an intrinsic field of Mars. The distribution of the magnetic field vectors between this region and the bow shock corresponds to the draping by the field lines. Author

N82-29250 Academy of Sciences (USSR), Moscow. Space Research Inst.
DISTRIBUTION OF THE MAGNETIC FIELD IN HALLEY'S COMET TAIL OBTAINED FROM THE PLASMA CLOUD KINETICS
E. M. Dubinin, P. L. Israelevich, and I. M. Podgorny 1982 14 p refs
(Rept-673) Copyright. Avail: Issuing Activity

The distribution of directions of magnetic field vectors along the trajectory was found by accelerations of a plasma cloud moving in Halley's comet tail. The field value in the cometary tail turns out to be maximum on the boundary and decreases sharply in the tail. It means that on the tail boundary there is a magnetic barrier. The map of the magnetic field in Halley's comet tail was plotted and agrees with the laboratory model of the induced magnetosphere. S.L.

N82-29251*# Brigham Young Univ., Provo, Utah.
PIONEER 10/11 DATA ANALYSIS OF THE MAGNETIC FIELD EXPERIMENT Final Report
Douglas E. Jones Jun. 1982 69 p refs
(Contract NAS2-7358)
(NASA-CR-166366; NAS 1.26:166366) Avail: NTIS HC A04/MF A01 CSCL 03B

Work conducted in support of the Pioneer missions to Jupiter (10,11), and Saturn (11) as well as the reduction, analysis and interpretation of magnetic field data obtained by the vector helium magnetometer on the Pioneer 10 and 11 spacecraft is summarized. Initial efforts concentrated primarily on the interplanetary data, and those aspects of the data of relevance to obtaining a better understanding of the interaction of the magnetized solar wind with the terrestrial magnetic field. After encounters of Jupiter and Saturn, the emphasis of research was directed primarily to an analysis of the planetary data. In particular, it soon became clear that there was a need for modelling of the various candidate magnetospheric currents suggested by the data. Results not published as yet, are also summarized. A.R.H.

N82-29252# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Raumfahrttechnik.
STICKING OF COMET DUST TO TARGET SURFACES [HAFTEN VON KOMETAREM STAUB AN TARGET-OBERFLAECHEN]
Peter Lell Apr. 1981 43 p refs In GERMAN
(TUM-LRT-TB-81/1) Avail: NTIS HC A03/MF A01

The construction and putting into operation of a dust simulation test stand to determine the sticking probability of comet dust to target surfaces is described. A study of the relevant literature was also made. Tests in a centrifuge were prepared. The first tests with polished gold targets show the expected results and lead to the application of structured target surfaces. These tests were conducted with glass globules with diameters from 5 to 250 microns at speeds between 5 and 200 m/sec. Particles with a diameter larger than 10 microns are reflected. The imprint cross section is smaller than the particle cross section. For globule speeds from 5 m/sec on, the target materials do not behave purely elastically. Author (ESA)

N82-29253# Technische Universitaet, Munich (West Germany). Lehrstuhl fuer Raumfahrttechnik.
COMET DUST COLLECTION [SAMMLUNG KOMETAREN STAUBES]
Peter Lell Dec. 1981 53 p refs In GERMAN Original contains color illustrations
(Contract DFG-lg-3/4)
(TUM-LRT-TB-81/13) Avail: NTIS HC A04/MF A01

Collection was simulated in the laboratory and dust particle sticking was investigated. The dust was collected on appropriate surfaces. Dust particles were accelerated up to 500 m/sec in a vacuum tank in order to determine their sticking probability to target surfaces. The difference between accelerated and sticking dust mixtures and the interaction between dust and target were investigated in detail and provide the elements for the planning of a flight experiment. Author (ESA)

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N82-29254 Academy of Sciences (USSR), Moscow. Space Research Inst.
SOLAR WIND MAGNETIC FIELD PENETRATION INTO COMETARY IONOSPHERES
L. S. Marochnik 1981 13 p refs
(Rept-685) Copyright. Avail: Issuing Activity

It is shown that when the solar wind interacts with cometary ionospheres its magnetic field penetrates through the contact surface into the coma. For Venus-like planets, the effect of regular field motion is not present so that the magnetic field in the ionospheres of nonmagnetic planets may be due to the instability of the ionosphere - ionopause boundary. Author

N82-29255# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
EVOLUTIONARY CHARTS OF SOLAR ACTIVITY (CALCIUM PLAGES) AS FUNCTIONS OF HELIOGRAPHIC LONGITUDE AND TIME Technical Report, 1964 - 1979
E. Ruth Hedeman, Helen W. Dodson, and Edmond C. Roelof Boulder, Colo. NOAA Aug. 1981 96 p refs
(UAG-81) Avail: NTIS HC A05/MF A01

The richness and diversity of data relating to solar activity present a challenge from the point of view of organization and evaluation. For phenomena such as plages and centers of activity that tend to last for more than one solar rotation, a sequence of evolutionary charts based on heliographic longitude for successive solar rotations are discussed. Such a diagrammatic representation of calcium plages as a function of longitude and time, coupled with considerations of heliographic latitude, permits relatively easy and confident recognition of successively returning centers of activity. Author

N82-29256# Air Force Geophysics Lab., Hanscom AFB, Mass. Space Physics Div.
IMPROVED 35 GHz RADIOMETER FOR SOLAR BURST MEASUREMENTS Scientific Interim Report
26 Aug. 1981 26 p refs
(AF Proj. 4643)
(AD-A113139; AFGL-TR-81-0253; AFGL-TP-304) Avail: NTIS HC A03/MF A01 CSCL 03/2

The new 35-GHz patrol radiometer at Sagamore Hill Solar Radio Observatory is described. The improved sensitivity of this system permits the detection of solar bursts down to about a 5-10 sfu level vs 50-100 sfu for the old system. This enhanced sensitivity will aid in the investigation of a wide range of topics pertaining to the physics of solar flares. These include but are not limited to spectral studies of large flare-bursts, correlations with hard X-ray data, and the detection of short cm-wavelength sharp-cutoff bursts. Author (GRA)

N82-29257# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
SOLAR OBSERVATIONS FROM THE P78-1 SATELLITE
Peter B. Landecker and David L. McKenzie 15 Feb. 1982 33 p refs
(Contract F04701-81-C-0082)
(AD-A112873; TR-0082(2940-01)-3; SD-TR-81-05) Avail: NTIS HC A03/MF A01 CSCL 22/2

Five experiments on the p78-1 satellite have been recording solar data from February 1979 to the present time (August 1981). The SOLEX X-ray spectrometer/spectroheliograph experiment is a pair of collimated Bragg crystal X-ray spectrometers (3-25 angstroms). The MONEX monitor X-ray experiment uses two uncollimated X-ray proportional counters (0.05 through 12 angstroms). The SOLFLEX solar flare X-ray experiment uses four uncollimated Bragg crystal X-ray spectrometers near 1.9, 3.0, 3.2 and 8.4 angstroms. The MAGMAP magnesium mapping experiment uses two filtered proportional counters which view the Sun through the SOLEX 60 arc sec collimator (8-12 angstroms). SOLWIND is a white light coronagraph viewing from 2.5 to 10 solar radii.

N82-29258# Stockholm Univ. (Sweden). Inst. of Physics.
ROTATIONAL ANALYSIS OF THE RED SYSTEM OF C-13N-14. PART 2: WAVE NUMBERS, TERM VALUES AND CONSTANTS
G. Hosinsky (Stockholm Observatory), L. Klynning, and B. Lindgren 6 Dec. 1981 23 p
(USIP-81-11) Avail: NTIS HC A03/MF A01

The (0,0) band of the red system was recorded in order to determine the positions of the C13N14 lines for a precision determination of the solar C12/C13 ratio measured intensities in the solar spectrum. As the light source used in this investigation gives a fairly low temperature, attempts were made to extrapolate the spectrum up to higher J-values. Unpublished high precision Fourier transform measurements of the (0,0) band of the red system of C13N were also consulted. From this data, comparisons with the extrapolated spectrum are drawn.
Author (ESA)

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N82-28968# Joint Publications Research Service, Arlington, Va.
MEASUREMENT OF CHARGE AND ENERGY SPECTRA OF HEAVY NUCLEI ABOARD COSMOS-936 ARTIFICIAL EARTH SATELLITE
S. A. Dashin, A. M. Marennyy, and G. P. Gertsen *In its* USSR Rept: Space Biol. and Aerospace Med., V. 16, No. 3, May - Jun. 1982 (JPRS 81197) 2 Jul. 1982 p 107-111 refs Transl. into ENGLISH from Kosm. Biol. Aviakosmicheskaya Med. (USSR), v. 16, no. 3, May - Jun. 1982 p 70-73 (For primary document see N82-28949 19-51)
Avail: NTIS HC A08

99 GENERAL

N82-29259# Southeastern Center for Electrical Engineering Education, Inc., St. Cloud, Fla.
UNITED STATES AIR FORCE SUMMER FACULTY RESEARCH PROGRAM. 1981 PROGRAM MANAGEMENT REPORT Final Report
Warren D. Peele Oct. 1981 142 p
(Contract F49620-79-C-0038; AF Proj. 2305)
(AD-A113707; AFOSR-82-0226TR) Avail: NTIS HC A07/MF A01 CSCL 05/1

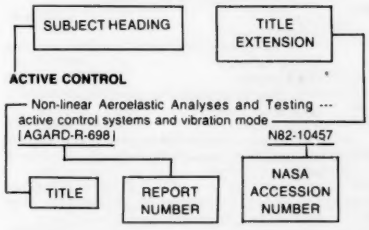
The United States Air Force Summer Faculty Research Program (USAF-SFRP) is a program designed to introduce university, college, and technical institute faculty members to Air Force research. This is accomplished by the faculty members being selected on a nationally advertised competive basis for a ten week assignment during the summer intercession to perform research at Air Force Laboratories/centers. Each assignment is in a subject area and at an Air Force facility mutually agreed upon by the faculty member and the Air Force. In addition to compensation and travel expenses, a cost of living allowance is also paid. The USAF-SFRP is sponsored by the Air Force Office of Scientific Research/Air Force Systems Command, United States Air Force, and is conducted by the Southeastern Center for Electrical Engineering Education, Inc. Author (GRA)

N82-29260# Office of Naval Research, London (England).
EUROPEAN SCIENTIFIC NOTES, VOLUME 36, NO. 3
Francis A. Richards, ed. and Don J. Peters, ed. 31 Mar. 1982 28 p refs
(AD-A114255; ESN-36-3) Avail: NTIS HC A03/MF A01 CSCL 05/10

This is a monthly publication presenting brief articles concerning recent developments in European Scientific research. Research articles discussed in this publication consist of the following topics: Amphetamines, Barbiturates, and Information Processing; Perception of Collision in Nighttime Driving; Predicting Human Performance in a New System; A New Software Technology Initiative at the UK Science and Engineering Research Council; Acoustic Emission from Paint Films; Ion Plating at Salford University; Twentieth International Conference on Acoustics-Ultrasound; Conditional Independence and Bayesian modeling; and Statistical Computing at Rothamsted. GRA

SUBJECT INDEX

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7050).

A

A-10 AIRCRAFT
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302

ABILITIES
On models and methods for performance measurement
[AD-A113578] N82-28998

ABLATION
A semi-analytical model for laser-induced ablation of fibre resin composites
[MRL-R-844] N82-28354
The high temperature thermochemical properties of carbon
[NASA-TM-84710] N82-28380

ABLATIVE MATERIALS
Low cost 2-D heatshield materials --- braided tapes
[AD-A113928] N82-28355

ABSORPTANCE
Crystal and molecular structures of selected organic and organometallic compounds and an algorithm for empirical absorption correction
[DE82-005451] N82-29210

ABSORPTION SPECTRA
Continuum absorption by H2O
[AD-A112264] N82-28372
High resolution spectral absorption in the short wavelength wing of the 2.7-micrometer water band at 1,000 K
[AD-A114156] N82-28383
Neutral interstellar gas in the lower galactic halo N82-29246

ABSORPTION SPECTROSCOPY
Surface enhanced spectroscopy
[AD-A114274] N82-28385
Reduction of spectral interferences in inductively coupled plasma-atomic emission spectrometry by selective spectral-line modulation
[AD-A112886] N82-29178

ABUNDANCE
Alumina availability - Domestic: A mineral availability system appraisal
[PB82-135468] N82-28769

ACCELERATION STRESSES (PHYSIOLOGY)
USSR report. Space biology and aerospace medicine, volume 16, no. 3, May - June 1982
[JPRS-81197] N82-28949
Problem of accelerations in aviation medicine N82-28950
Endurance of +Gz G forces by middle-aged people before and after 7-day immersion N82-28958

ACCELEROMETERS
New sensor concepts: Low cost vibrating beam accelerometer
[AD-A113644] N82-28272
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291
Micro-g triaxial piezoelectric satellite accelerometer system development
[AD-A113849] N82-28347
Inertial surveying technology
[AD-A107379] N82-28863
Measurement of sound power flow in bending waves along pipes. Part 2: Influence of a near field on measurements with two accelerometers
[TPD-008-785/1] N82-29117

ACCEPTABILITY
Performance assessment of materials and components of the Westinghouse coal gasification process development unit
[DE82-005995] N82-28401

ACCESS TIME
Separability as a physical database design methodology
[AD-A114138] N82-29228

ACCIDENT PREVENTION
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265

ACCUMULATORS
New look at long-term collector performance and utilizability
[DE82-005259] N82-28799

ACCURACY
Evaluation of various navigation system concepts
[AD-A112919] N82-28275
Report of the subpanel on methods of verification N82-28707
Geodetic control N82-28720
Map accuracy requirements: The cartographic potential of satellite image data N82-28721
Inter-image matching N82-28725

ACID BASE EQUILIBRIUM
Domestic swine in physiological research. 3: Blood gas and acid-base values of arterial and venous blood from young anesthetized pigs maintained under steady-state ventilatory conditions
[AD-A111834] N82-28945

ACID RAIN
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689

ACIDS
The role of microorganisms in marine corrosion processes
[AD-A114424] N82-28386

ACOUSTIC ATTENUATION
Attenuation of large amplitude pressure disturbances by liquid droplets
[AD-A114250] N82-28636
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111

ACOUSTIC DUCTS
Calculation procedure for sound propagation in a multisectional duct with uniform flow
[NLR-TR-79111-U] N82-29119
Calculation of sound suppression in a circular three-sectioned uniform flow duct
[NLR-TR-81002-U] N82-29120

ACOUSTIC EMISSION
Acoustic emission monitoring of production armor plate welds
[AD-A114419] N82-28650
Fundamental developments for quantitative acoustic emission measurements
[DE82-901315] N82-29114
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260

ACOUSTIC INSTABILITY
Acoustic instabilities as a source of turbulence in reduced density channels
[AD-A114275] N82-28592

ACOUSTIC LEVITATION
Properties of materials using acoustic waves
[AD-A114124] N82-29113

ACOUSTIC MEASUREMENT
Acoustic emission monitoring of production armor plate welds
[AD-A114419] N82-28650
Applied stress determination using computerized ultrasonic techniques
[DE82-003894] N82-28681

ACOUSTIC PROPAGATION
Calculation procedure for sound propagation in a multisectional duct with uniform flow
[NLR-TR-79111-U] N82-29119

ACOUSTIC PROPERTIES
Evaluation of requirements for militarization of 3 kW free piston Stirling engine generator sets
[AD-A113409] N82-28648

ACOUSTIC VELOCITY
The effect of strain upon the velocity of sound and the velocity of free retraction for natural rubber
[AD-A114238] N82-28453
Properties of materials using acoustic waves
[AD-A114124] N82-29113
Variability and sensitivity of coupled mixed layer acoustic model systems
[AD-A114302] N82-29123

ACOUSTICS
Analog data compression for Versatile Experimental Kevlar Array (VEKA) telemetry
[AD-A114324] N82-28343
The effect of strain upon the velocity of sound and the velocity of free retraction for natural rubber
[AD-A114238] N82-28453
Variability and sensitivity of coupled mixed layer acoustic model systems
[AD-A114302] N82-29123

ACOUSTO-OPTICS
Acoustooptic time-integrating correlators and optoelectronic mixers
[AD-A114149] N82-28548

ACTINIDE SERIES COMPOUNDS
Coordination chemistry of several radius-sensitive complexones and applications to lanthanide-actinide separations
[DE82-005547] N82-28396

ACTIVATION ENERGY
Thermal analysis of SYNROC gel microspheres
[DE82-003472] N82-28399
ACTIVE CONTROL
CF6 jet engine performance improvement: High pressure turbine active clearance control
[NASA-CR-165556] N82-28297
ACTUATORS
Digital sequential solid-state relay tester
[DE82-004680] N82-28610
ADAPTATION
Sleep, circadian cycles of physiological functions and parameters of human work capacity on first day after changing from altered to usual sleep-waking cycle N82-28951
Human external respiration and gas exchange in acute period of adaptation to immersion in water N82-28959
Adapative motivation theory
[AD-A111195] N82-28997
ADAPTIVE CONTROL
NASA Adaptive Multibeam Phased Array (AMPA): An application study
[NASA-CR-169125] N82-28503
Application of phase retrieval
[AD-A113383] N82-29161
ADAPTIVE OPTICS
Application of phase retrieval
[AD-A113383] N82-29161
ADDITIVES
Silver-doping effects and photostructural transformation in evaporated As2S3 thin films
[AD-A113148] N82-28375
Processing and properties of Zn0 based varistors
[DE82-005583] N82-28565
Preparation of rare earth doped YAG laser materials
[AD-A113608] N82-28623
ADHESIVE BONDING
Properties of organic matrix short fiber composites
[AD-A113606] N82-28358
ADIABATIC CONDITIONS
Erosion mechanisms of metals
[AD-A111537] N82-28418
Conceptual design and engineering studies of adiabatic Compressed Air Energy Storage (CAES) with thermal energy storage
[DE82-005483] N82-28823
ADRENOCORTICOTROPIN (ACTH)
Role of hormonal compounds in regulation of electrolyte metabolism in the presence of emotional stress N82-28952
AERIAL PHOTOGRAPHY
Aerial radiological and photographic survey of eleven atolls and two islands within the Northern Marshall Islands. Dates of surveys, July-November 1978
[DE82-005584] N82-28752
AERIAL RECONNAISSANCE
Earth Resources: A continuing bibliography with indexes, issue 33
[NASA-SP-7041(33)] N82-28695
Airborne gamma-ray spectrometer and magnetometer survey Coos Bay, Oregon, volume 1
[DE82-005534] N82-28750
Hydrogeochemical and stream sediment reconnaissance basic data for Tularosa quadrangle, New Mexico
[DE82-000787] N82-28756
Summer MONEX US research flight missions, May - July 1979
[PB82-158718] N82-28923
AEROACOUSTICS
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111
Some comments on the prediction of forward flight effects on jet noise
[MPIS-20/1981] N82-29118
AERODYNAMIC CHARACTERISTICS
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249
Comparison of laser anemometer measurements and theory in an annular turbine cascade with experimental accuracy determined by parameter estimation
[NASA-TM-82860] N82-28250
Viscous effect on airfoils for unsteady transonic flows
[NASA-CR-166335] N82-28251
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624
AERODYNAMIC FORCES
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252
AERODYNAMIC HEAT TRANSFER
Preliminary analysis of STS-3 entry heat-transfer data for orbiter windward centerline
[NASA-TM-84500] N82-28575
AERODYNAMIC HEATING
Computational aerodynamics at Weapons Systems Research Laboratory
[AD-A112867] N82-28257
AERODYNAMIC INTERFERENCE
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference --- wind tunnel tests
[NLR-MP-81020-U] N82-28262
AERODYNAMIC LOADS
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296
AERODYNAMIC NOISE
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111
AERODYNAMICS
General aviation activity and avionics survey
[AD-A112924] N82-28244
AEROELASTICITY
Wind-tunnel evaluation of an aeroelastically conformable rotor
[AD-A114384] N82-28260
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280
AEROLOGY
Special observations by the Hohenpeissenburg Meteorological Observatory. No. 44: Results of aerological and surface ozone measurements during the first semester of 1981
[ISSN-0581-1287] N82-28877
AEROSOLS
Analysis of the atmospheric aerosol size distribution information retrievable from near-limb angular radiance measurements taken on Mauna Loa, Hawaii
[DE82-005999] N82-28851
Critical assessment of a series of lidar aerosol measurement results
[DFVLR-FB-82-03] N82-28853
Extinction by aerosol clouds of nonspherical particles at arbitrary wavelengths
[AD-A113535] N82-29163
AEROSPACE MEDICINE
USSR report. Space biology and aerospace medicine, volume 16, no. 3, May - June 1982
[JPRS-81197] N82-28949
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 232)
[NASA-SP-7011(232)] N82-28984
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 233, June 1982
[NASA-SP-7011(233)] N82-28985
AEROSPACE VEHICLES
Terrestrial environment (climatic) criteria guidelines for use in aerospace vehicle development
[NASA-TM-82473] N82-28317
AGE FACTOR
Endurance of +Gz G forces by middle-aged people before and after 7-day immersion N82-28958
AGROCLIMATOLOGY
Reports from the German Meteorological Service. Number 158: Contribution to phenology of Europe 4 long term phenological observation series for western, central, and eastern Europe
[ISSN-0072-4130] N82-28876
AIR CARGO
Aircraft and crew scheduling during airlift operations
[AD-A114114] N82-29011
AIR CONDITIONING
Heat pump operating with a mixture of fluids
[PB82-143611] N82-28602
Technical options for reducing chlorofluorocarbon emissions
[RAND-R-2879-EPA] N82-28840
AIR CONDITIONING EQUIPMENT
An evaluation of strategies to control noise from air conditioning and refrigeration condensing units
[PB82-165903] N82-28496
AIR NAVIGATION
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291
AIR POLLUTION
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268
Coupling of transport and chemical processes in catalytic combustion
[DE82-006267] N82-28403
Strategies for steam handling and H2S abatement at geothermal power plants in the geysers area of Northern California
[DE82-001144] N82-28796
Ecological implications of air pollutants from synthetic-fuels processing
[DE82-002792] N82-28844
Geochemical and geophysical models of the fossile-fuel CO2 climate problem
[DE82-005484] N82-28917
AIR PURIFICATION
Modification of method for assaying ozone by the diacetyl dihydrolutidine reaction N82-28973
AIR QUALITY
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1
[AD-A113665] N82-28842
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, part 2
[AD-A113666] N82-28843
Modification of method for assaying ozone by the diacetyl dihydrolutidine reaction N82-28973
AIR SAMPLING
Impregnated filters for the determination of formaldehyde in indoor environments
[DE82-004025] N82-28852
AIR SEA ICE INTERACTIONS
MIZEX. A program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 1: Research strategy
[AD-A107046] N82-28740
AIR TRAFFIC CONTROL
Electronic/electric technology benefits study --- avionics
[NASA-CR-165890] N82-28243
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43)
[B-206064] N82-28264
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265
Special investigation report: Air traffic control system
[PB82-136276] N82-28277
AIR WATER INTERACTIONS
Scientific opportunities using satellite wind stress measurements over the ocean
[NASA-CR-169100] N82-28879
AIRBORNE EQUIPMENT
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523
Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking
[NASA-TM-73298] N82-28690
AIRBORNE/SPACEBORNE COMPUTERS
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
AIRCRAFT ACCIDENTS
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268

AIRCRAFT ANTENNAS
Delta electrical load analysis C-141B JACC/CP aircraft
[AD-A113761] N82-28283
Dielectric lens antenna for EHF airborne satellite communication terminals
[AD-A113250] N82-28515
AIRCRAFT BRAKES
Alert aircraft roll over chocks
[AD-A107456] N82-28307
AIRCRAFT CONTROL
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265
Evaluations of helicopter instrument-flight handling qualities
[AD-A114004] N82-28285
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302
AIRCRAFT DESIGN
The determination of gust loads on nonlinear aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28303
AIRCRAFT ENGINES
Advances in high-speed rolling-element bearings
[NASA-TM-82910] N82-28644
AIRCRAFT EQUIPMENT
A compendium of lightning effects on future aircraft electronic systems
[AD-A114117] N82-28293
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552
AIRCRAFT FUELS
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994
AIRCRAFT HYDRAULIC SYSTEMS
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294
AIRCRAFT NOISE
Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations
[AD-A113672] N82-28841
AIRCRAFT PILOTS
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265
Problem of accelerations in aviation medicine
N82-28950
Development of a methodology for assessing aircrew workloads
[AD-A114364] N82-29010
AIRCRAFT PRODUCTION
International aviation (selected articles)
[AD-A114422] N82-28245
AIRCRAFT SAFETY
Climatology tables for 7 Corps forward areas
[AD-A113034] N82-28902
AIRCRAFT STRUCTURES
Advanced casting: Today and tomorrow — aerospace industry components casting N82-28486
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624
AIRCRAFT TIRES
Alert aircraft roll over chocks
[AD-A107456] N82-28307
AIRFOILS
Influence of surface static-pressure orifices on boundary-layer transition — tests conducted in the Langley Low-Turbulence Pressure Tunnel
[NASA-TM-84492] N82-28248
Viscous effect on airfoils for unsteady transonic flows
[NASA-CR-166335] N82-28251
AIRGLOW
Airglow imaging studies of natural and artificially induced ionospheric disturbances
[AD-A114369] N82-28866
AIRPORTS
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43)
[B-206064] N82-28264
ALASKA
Regional assessment of aquifers for thermal-energy storage. Volume 2: Regions 7 through 12
[DE82-002506] N82-28828
ALCOHOLS
Alcohol Fuels Program Technical Review, summer, 1981
[DE82-006904] N82-28474
Emission characterization of an alcohol/diesel-pilot fueled compression ignition engine and its heavy-duty diesel counterpart
[PB82-154113] N82-28654
ALDOSTERONE
Role of hormonal compounds in regulation of electrolyte metabolism in the presence of emotional stress N82-28952
ALGORITHMS
A class of efficient contention resolution algorithms for multiple access channels — discrete time multiaccess
[AD-A113840] N82-28512
Portable random number generator for use in signal processing
[DE82-006831] N82-28532
Conversion of algorithms to custom integrated circuit devices
[AD-A113822] N82-28553
Numerical algorithm for rapid integration of turbulence-model equations on elliptic regions
[AD-A113013] N82-28583
Report of the subpanel on resampling functions
N82-28705
Ocean altimetry algorithms status: March 1982
[AD-A114325] N82-28935
Algorithms for autonomous star identification
[NASA-TM-84789] N82-29031
Decision algorithms for multiplayer games of incomplete information
[AD-A114334] N82-29053
Decentralized resource management in distributed computer systems
[AD-A113255] N82-29069
Impact of finite precision arithmetic on algorithm design, part 1
[AD-A113981] N82-29076
Implementation of the Gibbs-Poole-Stockmeyer algorithm and the Gibbs-King algorithm
[AD-A113104] N82-29078
Classification of data sets
[BMVG-FBWT-80-17] N82-29103
Application of phase retrieval
[AD-A113383] N82-29161
ALKALI METALS
Super hydrides
[AD-A113229] N82-28449
ALKALINE EARTH METALS
Photocatalytic hydrogen production from water and intermetallic compound formation on single-crystal surfaces of titanium oxides
[DE82-004952] N82-28393
ALKALINITY
Sampling frequency for water quality monitoring
[PB82-145343] N82-28770
ALKANES
Steam reforming of n-hexane on pellet and monolithic catalyst beds. A comparative study on improvements due to heat transfer N82-28789
ALKYLATION
Chemistry and morphology of coal liquefaction
[DE82-005141] N82-28392
ALLOYS
Magnetic properties of alloys containing mischmetal, cobalt, copper, iron, and magnesium
[PB82-158940] N82-28439
ALTERNATING CURRENT
Fundamentals of electrical propulsion plant design
[AD-A114423] N82-28561
ALTITUDE
Ocean altimetry algorithms status: March 1982
[AD-A114325] N82-28935
ALUMINUM
A study of the breakdown mechanism of AISI 304 stainless steel, type 2024 aluminum and various titanium coatings
[AD-A113831] N82-28414
Rapidly-refuelable 167-CM(2) aluminum-air power cell
[DE82-006251] N82-28826
ALUMINUM ALLOYS
Improvement of transverse strength in graphite-aluminum composites by high-strength surface foils
[AD-A114105] N82-28360
The influence of solution treatment time and quench rate on microstructure and mechanical properties of high magnesium aluminum magnesium alloys
[AD-A113826] N82-28413
Evaluation and handbook data of 7050 rivets, volume 1
[AD-A113380] N82-28415
Effect of defects in aluminum P/M
[AD-A113134] N82-28416
On microstructural control of near threshold fatigue crack growth in 7000 series aluminum alloys
[AD-A113486] N82-28417
Investigation of corrosion and microstructural properties of high strength aluminum alloys after Jominy testing
[NLR-MP-81004-U] N82-28432
The influence of different types of anodic layers on the fatigue properties of 2024-T3 and 7075-T6 sheet material
[NLR-TR-80077-U] N82-28433
The Jominy end-quench test for investigation of corrosion properties and microstructure of high strength aluminum alloys
[NLR-TR-80102-U] N82-28434
Advanced casting: Today and tomorrow — aerospace industry components casting N82-28486
Stress corrosion crack initiation testing of high strength aluminum alloys using tuning fork type specimens
[NLR-TR-81053-U] N82-28686
ALUMINUM COATINGS
Galvanically precipitated aluminum: A new material — for protective coating
[MBB-515-82-O] N82-28431
Method of protecting a surface with a silicon-slurry/aluminide coating — coatings for gas turbine engine blades and vanes
[NASA-CASE-LEW-13343-1] N82-28441
ALUMINUM GRAPHITE COMPOSITES
Improvement of transverse strength in graphite-aluminum composites by high-strength surface foils
[AD-A114105] N82-28360
ALUMINUM OXIDES
Alumina availability - Domestic: A mineral availability system appraisal
[PB82-135468] N82-28769
AMBIENCE
Entrainment modelling of buoyant momentum jets in water
[AD-A112797] N82-28580
AMBIENT TEMPERATURE
Environmental data for sites in the National Solar Data Network, October 1981
[DE82-002706] N82-28850
Effect of high ambient temperature on carbohydrate metabolism in rat liver and skeletal muscles
N82-28975
AMINES
Preparation of perfluorinated 1,2,4-oxadiazoles
[NASA-CASE-ARC-11267-2] N82-28353
AMORPHOUS MATERIALS
Structural and electronic studies of defects in amorphous silicon
[DE82-004477] N82-29213

AMPLIFIER DESIGN
High power metallic halide laser --- amplifying a copper chloride laser
[NASA-CASE-NPO-14782-1] N82-28616
AMPLIFIERS
The 2-D nonlinear theory of the free electron laser amplifier for an electron beam with finite axial and transverse dimensions
[AD-A114220] N82-28638
ANALOG DATA
An inexpensive 15 MHz fiber optic analog data link
[TRITA-PFU-82-05] N82-29172
ANALOG TO DIGITAL CONVERTERS
System architecture study of an orbital GPS user terminal
[NASA-CR-166821] N82-28501
Discrete control of continuous processes
[AD-A113839] N82-29070
ANALYSIS (MATHEMATICS)
Solving the Navier-Stokes equations with LSODI and the method of lines
[DE82-006179] N82-28594
ANALYSIS OF VARIANCE
Reports from the German Meteorological Service. Number 156: Statistics for the global radiation at eight stations of the German Meteorological Service
[ISSN-0072-4130] N82-28857
Small sample properties of robust analysis of variance for fixed and random effects models
[AD-A113877] N82-29095
ANALYTIC FUNCTIONS
A numerical method for analytic continuation of conformal mappings
[TRITA-NA-8118] N82-29089
ANGLE OF ATTACK
An investigation of the flow about an ogive cylinder at high angles of incidence
[AD-A113356] N82-28256
ANGULAR DISTRIBUTION
Auroral particle distribution functions and their relationships to inverted Vs and auroral arcs
[AD-A114365] N82-28867
ANISOTROPY
Anisotropic embrittlement in high-hardness ESR 4340 steel forgings
[AD-A113906] N82-28412
ANNEALING
Studies of the dynamic and mechanical properties of thermoplastics by the split Hopkinson pressure bar method
[PH-130] N82-28443
ANNIHILATION REACTIONS
Study of photoexcited states by positron method
[DE82-005469] N82-29143
ANNUAL VARIATIONS
Mathematical models of water yield with particular reference to Mississippi watersheds. Mathematical modeling of watershed yield
[PN82-157868] N82-28772
New look at long-term collector performance and utilizability
[DE82-005259] N82-28799
Total electron content variations at mid-and high-latitudes
[AD-A113683] N82-28860
Reports from the German Meteorological Service. Number 158: Contribution to phenology of Europe 4 long term phenological observation series for western, central, and eastern Europe
[ISSN-0072-4130] N82-28876
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Kansas City IAP, Missouri. Parts A-F
[AD-A113179] N82-28895
The annual variation of the large-scale 500 mb and sea level pressure fields
[DM-35] N82-28918
ANODIC COATINGS
The influence of different types of anodic layers on the fatigue properties of 2024-T3 and 7075-T6 sheet material
[NLR-TR-80077-U] N82-28433
ANODIC STRIPPING
The application of a bubbling mercury electrode to anodic stripping voltammetry. Determination of zinc, cadium, lead and copper in natural water and industrial waste
[CRIC-T-6565] N82-28791
ANODIZING
Development of a surface technology for GaAs devices
[AD-A112913] N82-29206
ANTENNA ARRAYS
NASA Adaptive Multibeam Phased Array (AMPA): An application study
[NASA-CR-169125] N82-28503
Tent shaped phased array rests
[AD-A113191] N82-28516
A 20 GHz circularly polarized, fan beam slot array antenna
[AD-A114291] N82-28525
ANTENNA COMPONENTS
Preliminary sizing of vibration absorber for space mast structures
[NASA-TM-84488] N82-28346
ANTENNA COUPLERS
Flight termination system equipment. Volume 1: Antennas and antenna couplers
[AD-A113493] N82-28320
ANTENNA DESIGN
Improved 243 MHz homing antenna system for use on helicopters
[NLR-MP-81022-U] N82-28276
LMSS telecommunication network design N82-28327
MSAT design N82-28328
Mobile vehicle antenna N82-28329
The ground segment N82-28334
Cassegrain dual reflector antenna design --- MSAT UHF antenna N82-28336
Dual-shaped reflector design N82-28337
Multiple beam offset antenna design processes --- MSAT antenna N82-28340
Buried insulated antennas
[RSRE-MEMO-3418] N82-28497
A 20 GHz circularly polarized, fan beam slot array antenna
[AD-A114291] N82-28525
Offset reflector antennas: Design, computation, construction and pattern measurements
[DFVLR-MITT-81-33] N82-28535
On the power output of some idealized source configurations with one or more characteristic dimensions
[NASA-CR-169132] N82-29074
ANTENNA FEEDS
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report
[NASA-CR-169136] N82-28330
Satellite system design N82-28333
The technology N82-28335
Dual polarization N82-28338
Tent shaped phased array rests
[AD-A113191] N82-28516
ANTENNA RADIATION PATTERNS
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies. Part 1: Executive summary
[NASA-CR-169135] N82-28325
Land Mobile Satellite Service N82-28326
Mobile vehicle antenna N82-28329
Dual polarization N82-28338
Multiple beam offset antenna design processes --- MSAT antenna N82-28340
Buried insulated antennas
[RSRE-MEMO-3418] N82-28497
NASA Adaptive Multibeam Phased Array (AMPA): An application study
[NASA-CR-169125] N82-28503
Tent shaped phased array rests
[AD-A113191] N82-28516
Near field antenna measurement system
[AD-A114125] N82-28522
A 20 GHz circularly polarized, fan beam slot array antenna
[AD-A114291] N82-28525
Offset reflector antennas: Design, computation, construction and pattern measurements
[DFVLR-MITT-81-33] N82-28535
On the power output of some idealized source configurations with one or more characteristic dimensions
[NASA-CR-169132] N82-29074
ANTENNAS
Buried insulated antennas
[RSRE-MEMO-3418] N82-28497
Dielectric lens antenna for EHF airborne satellite communication terminals
[AD-A113250] N82-28515
ANTHROPOMETRY
Simulation of the motion of the center of mass of an occupant under ejection accelerations
[AD-A113806] N82-28989
APPALACHIAN MOUNTAINS (NORTH AMERICA)
Regional assessment of aquifers for thermal-energy storage. Volume 2: Regions 7 through 12
[DE82-002506] N82-28828
APPROACH CONTROL
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
[NASA-CR-3574-PT-4] N82-28269
APPROXIMATION
Feasibility of B spline data reduction on remote sensing data
[NLR-TR-80023-U] N82-28767
AQUATIC PLANTS
Biota and biological principles of the aquatic environment
[CIRC-848-A] N82-28688
AQUEOUS SOLUTIONS
Octanol/water partition coefficients and aqueous solubilities of organic compounds
[PB82-141797] N82-28408
Hydraulic tests of tanks for dangerous goods --- determination of the test pressure
[SP-RAPP-1982:01] N82-28683
AQUIFERS
Verification of the potential yield and chemical quality of the allow dolomite aquifer in DuPage County, Illinois
[PB82-158361] N82-28779
Regional assessment of aquifers for thermal energy storage. Volume 1: Regions 1 through 6
[DE82-002507] N82-28827
Regional assessment of aquifers for thermal-energy storage. Volume 2: Regions 7 through 12
[DE82-002506] N82-28828
Regional assessment of aquifers for thermal-energy storage. Volume 3: Appendices
[DE82-002505] N82-28829
ARCHITECTURE
Preparing and communicating habitability design information
[AD-A113379] N82-28518
Design handbook for photovoltaic power systems. Volume 1: Simplified methods for utility interconnected systems
[DE82-003108] N82-28810
Summary of the Northstar home: An extension of the Solar 80 Program
[DE82-004688] N82-28817
ARCHITECTURE (COMPUTERS)
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report
[NASA-CR-169136] N82-28330
LMSS communication network design N82-28332
System architecture study of an orbital GPS user terminal
[NASA-CR-166821] N82-28501
Distributed operating system design study, volume 1
[AD-A113172] N82-29067
Distributed operating system design study, volume 2
[AD-A113173] N82-29068
Decentralized resource management in distributed computer systems
[AD-A113255] N82-29069
ARCTIC REGIONS
MIZEX. A program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 1: Research strategy
[AD-A107046] N82-28740
Users manual for polar ice forecast subsystem: Arctic
[AD-A114351] N82-28932
Program maintenance manual polar ice forecast subsystem: Arctic
[AD-A114343] N82-28933

ARIZONA
Hydrogeochemical and stream sediment reconnaissance basic data for Silver City quadrangle, New Mexico; Arizona
[DE82-000852] N82-28761
Terminal Forecast Reference Notebook, Fresno Air Terminal, California
[AD-A107434] N82-28884

ARMOR
Acoustic emission monitoring of production armor plate welds
[AD-A114419] N82-28650

ARSENIC COMPOUNDS
Silver-doping effects and photostructural transformation in evaporated As2S3 thin films
[AD-A113148] N82-28375

ARTIFICIAL INTELLIGENCE
An intelligent control strategy for computer consultation
[AD-A113388] N82-29016
Report of Ad Hoc NDAB subgroup --- numerical data
[AD-A112955] N82-29227

ARTIFICIAL SATELLITES
Comparison of theoretical and actual satellite microwave brightness temperatures to determine snowpack properties
[PB82-161118] N82-28774
Autonomous scheduling technology for Earth orbital missions
[NASA-CR-168939] N82-29217
NASA authorization for fiscal year 1983
[GPO-91-557] N82-29233

ASSESSMENTS
Performance assessment of materials and components of the Westinghouse coal gasification process development unit
[DE82-005995] N82-28401
Small hydro-electric resource assessment: Hauraki area
[DE82-901428] N82-28757

ASTROMETRY
On astro-gravimetric calculation of the quasigeoids for the Federal Republic of Germany
[SER-A-92] N82-28872

ASTRONOMY
Fine resolution imaging of space objects
[AD-A113911] N82-29160

ASYMMETRY
Method for the preparation of thin-skinned asymmetric reverse osmosis membranes and products thereof
[NASA-CASE-ARC-11359-1] N82-28444
Offset reflector antennas: Design, computation, construction and pattern measurements
[DFVLR-MITT-81-33] N82-28535

ASYMPTOTIC METHODS
Calculation of linear stability with the aid of asymptotic solutions of Orr-Sommerfeld equation. Part 1. The treatment of the linear stability problems for (alpha)R 1 containing one simple turning point; Two dimensional quasi-parallel flow: Jeffery-Hamel flow
[DE81-700130] N82-29086

ASYMPTOTIC SERIES
Ascending and asymptotic series for squares, products and cross-products of modified Bessel functions
[AD-A113307] N82-29108

ATLANTIC OCEAN
Ocean current effects on marine seismic systems and deployments
[AD-A114135] N82-28934

ATMOSPHERIC ATTENUATION
A Fourier transform spectrometer for visible and near ultra-violet measurements of atmospheric absorption
[NASA-TM-73297] N82-28606
Equipment and tracking test results for the NRL ship-to-ship DF laser transmission experiment
[AD-A113485] N82-28631
Infrared transmittance of marine atmospheres --- sea surface temperature
[AD-A114414] N82-29164
Determination of the intrinsic Q(3)/5(1) line intensity ratio of molecular hydrogen
[ATR-82(8415)-1] N82-29247

ATMOSPHERIC CHEMISTRY
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1
[AD-A113665] N82-28842
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, part 2
[AD-A113666] N82-28843
The electron avalanche ionization of air and a simple air chemistry model
[AD-A113501] N82-28864
One-and two dimensional photochemical modeling of the chemical interactions in the middle atmosphere (0-120 km)
[PB82-156613] N82-28874

ATMOSPHERIC CIRCULATION
Circulation statics for the extratropical Northern Hemisphere based on NMC analyses
[PB82-158759] N82-28925
Winter MONEX US research flight missions, December 1978
[PB82-158767] N82-28929

ATMOSPHERIC COMPOSITION
Special observations by the Hohenpeissenburg Meteorological Observatory. No. 44: Results of aerological and surface ozone measurements during the first semester of 1981
[ISSN-0581-1287] N82-28877

ATMOSPHERIC CONDUCTIVITY
One-and two dimensional photochemical modeling of the chemical interactions in the middle atmosphere (0-120 km)
[PB82-156613] N82-28874

ATMOSPHERIC DENSITY
Critical assessment of a series of lidar aerosol measurement results
[DFVLR-FB-82-03] N82-28853

ATMOSPHERIC EFFECTS
Terrestrial environment (climatic) criteria guidelines for use in aerospace vehicle development
[NASA-TM-82473] N82-28317
Capturing energy from the wind
[NASA-SP-455] N82-28783
Program listings for EOSAEL 80-B and ancillary codes AGAUS and FLASH. Volume 2: User's manual supplement
[AD-A114417] N82-29054

ATMOSPHERIC MODELS
Geochemical and geophysical models of the fossile-fuel CO2 climate problem
[DE82-005484] N82-28917

ATMOSPHERIC MOISTURE
Optical and in situ measuring of structure parameters relevant to temperature and humidity and their application to the measuring of sensible and latent heat flux --- atmospheric optics
[AD-A114336] N82-28637

ATMOSPHERIC PHYSICS
Atmospheric transmittance/radiance computer code FASCOD2
[AD-A113825] N82-28859

ATMOSPHERIC PRESSURE
The annual variation of the large-scale 500 mb and sea level pressure fields
[DM-35] N82-28918

ATMOSPHERIC REFRACTION
An atmospheric refractive index fluctuation meter
[RSRE-MEMO-3433] N82-28856

ATMOSPHERIC SOUNDING
Critical assessment of a series of lidar aerosol measurement results
[DFVLR-FB-82-03] N82-28853
Second International Ozone Sonde Intercomparison Conference, 5-20 April 1978
[ISSN-0012-4130] N82-28858

ATMOSPHERIC TEMPERATURE
Optical and in situ measuring of structure parameters relevant to temperature and humidity and their application to the measuring of sensible and latent heat flux --- atmospheric optics
[AD-A114336] N82-28637
Percentage frequency distributions of temperature and humidity for Australia (1963-77)
[AD-A113664] N82-28885
Modeling temperature data: An illustration of the use of biplots and bimodels in nonlinear modeling
[AD-A114169] N82-28907
Bulletin of hydrological and meteorological Service, selected articles
[AD-A114382] N82-28910

ATMOSPHERIC TURBULENCE
The determination of gust loads on nonlinear aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28303
Optical and in situ measuring of structure parameters relevant to temperature and humidity and their application to the measuring of sensible and latent heat flux --- atmospheric optics
[AD-A114336] N82-28637
Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
[NASA-CR-3571] N82-28881

ATOLLS
Aerial radiological and photographic survey of eleven atolls and two islands within the Northern Marshall Islands. Dates of surveys, July-November 1978
[DE82-005584] N82-28752

ATOMIC ENERGY LEVELS
Study of photoexcited states by positron method
[DE82-005469] N82-29143

ATOMIC SPECTRA
Reduction of spectral interferences in inductively coupled plasma-atomic emission spectrometry by selective spectral-line modulation
[AD-A112886] N82-29178

ATTACK AIRCRAFT
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284
Historical inflation program. A computer program generating historical inflation indices for Army aircraft
[AD-A114053] N82-29232

ATTITUDE CONTROL
Autonomous onboard attitude determination system specifications and requirements
[NASA-TM-84800] N82-29056

ATTITUDE GYROS
Autonomous onboard attitude determination system specifications and requirements
[NASA-TM-84800] N82-29056

ATTITUDE STABILITY
Attitude tracker N82-28736

AUDIO FREQUENCIES
Audio conferencing using dynamic channel-assignment system
[AD-A114122] N82-28528

AUDITORY STIMULI
Effect of caloric stimulation of vestibular system on hearing N82-28963

AURORAL ARCS
Auroral particle distribution functions and their relationships to inverted Vs and auroral arcs
[AD-A114365] N82-28867

AUSTENITIC STAINLESS STEELS
In-bed corrosion tests of superheater alloys in a 10-square-foot AFBC
[DE82-901346] N82-28427

AUSTRALIA
Laser hydrography in Australia
[AD-A113584] N82-28741
Percentage frequency distributions of temperature and humidity for Australia (1963-77)
[AD-A113664] N82-28885
A design study for a meteorological instrumentation system for an Omega tower
[AD-A112868] N82-28906

AUTOCORRELATION
Bias reduction
[AD-A114254] N82-29100

AUTOMATIC CONTROL
Application, sizing, testing and performance of the photovoltaic battery subsystem at Natural Bridges National Monument, Utah
[DE82-007040] N82-28832

AUTOMATIC FLIGHT CONTROL
Minimum operational performance standards for automatic direction finding (ADF) equipment
[RTCA/DO-179] N82-28270

AUTOMATIC LANDING CONTROL
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
[NASA-CR-3574-PT-4] N82-28269

AUTOMATIC PILOTS
Gust response of commerical jet aircraft including effects of autopilot operation
[NASA-CR-165919] N82-28266

AUTOMOBILE ENGINES
Automotive Stirling engine development program
[NASA-CR-167907] N82-29235

AUTOMOBILE FUELS
Alcohol Fuels Program Technical Review, summer, 1981
[DE82-006904] N82-28474
AVAILABILITY
Availability analysis of a multiplex system
[FUB-30-1981] N82-28533
Alumina availability - Domestic: A mineral availability system appraisal
[PB82-135468] N82-28769
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901280] N82-29106
AVIONICS
Electronic/electric technology benefits study --- avionics
[NASA-CR-165890] N82-28243
General aviation activity and avionics survey
[AD-A112924] N82-28244
Advanced aircraft elecrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113833] N82-28284
SD/LDEF technical User's Manual
[AD-A113504] N82-28324
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
AXIAL FLOW
A method for the circulation of invariant manifolds in hydrodynamic stability problems
[PB82-158825] N82-28603
AXIAL FLOW TURBINES
The influence of the working fluid on a turbine and Rankine cycle design efficiency
[MBB-UR-535-82-O] N82-28652
AZIMUTH
Ocean current effects on marine seismic systems and deployments
[AD-A114135] N82-28934

B

BACKGROUND NOISE
Ambient noise in the western Gulf of Mexico
[AD-A114126] N82-28931
BACTERIA
The role of microorganisms in marine corrosion processes
[AD-A114424] N82-28386
BALANCING
Automatic and continuous transducer-drift compensator for endpoint detection systems
[PB82-135534] N82-28614
BALLISTIC MISSILES
China's ballistic missile program
[AD-A114260] N82-28321
BALLOON-BORNE INSTRUMENTS
A PCM encoder for balloon sondes
[INW-8102] N82-28344
Second International Ozone Sonde Intercomparison Conference, 5-20 April 1978
[ISSN-0012-4130] N82-28858
BANDWIDTH
Frequency compression of wideband signals using a distributed sampling technique
[AD-A113428] N82-28519
Implementation of the Gibbs-Poole-Stockmeyer algorithm and the Gibbs-King algorithm
[AD-A113104] N82-29078
BARRIERS (LANDFORMS)
OTT: A computer aided ground wave model for the VHF range in hilly terrain with varying ground characteristics
[FOA-C-30265-E2] N82-29088
BATHS
Effect of applied stress, thermal environment and water in epoxy resins
[AD-A113016] N82-28450
BATHYMETERS
Marine sciences group
[DE82-005145] N82-28940
BAYES THEOREM
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260
BEADS
Thermal analysis of SYNROC gel microspheres
[DE82-003472] N82-28399
BEAM CURRENTS
Heat removal from the simulation electrode of a high power log pulse ion source
[DE81-700008] N82-29192
BEAM INJECTION
Injection space charge: Enlargements of flux density functioning point choice
[DE82-002299] N82-29131
RF plasma sources for neutral-beam-injection systems. Phase 1: Definition study
[DE82-004193] N82-29182
BEAM LEADS
Analysis of continuous beams with joint slip
[AD-A107112] N82-28669
BEAMS (SUPPORTS)
Requirements for flexure testing of brittle materials
[AD-A113937] N82-28447
Analysis of continuous beams with joint slip
[AD-A107112] N82-28669
BEARINGS
Aseismic base isolation N82-28662
BEHAVIOR
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Orienting and exploratory behavior of gray rat in open field. Zoopsychological analysis N82-28981
BENDING
Requirements for flexure testing of brittle materials
[AD-A113937] N82-28447
Bending of a Ray in a random inhomogeneous medium
[PB82-148966] N82-28543
Measurement of sound power flow in bending waves along pipes. Part 2: Influence of a near field on measurements with two accelerometers
[TPD-008-785/1] N82-29117
BENDING THEORY
Proceedings of the Conference on Finite Element Methods in South Africa N82-28671
BENZENE POISONING
An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994
BERYLLIUM
Materials research for advanced inertial instrumentation. Task 2: Gas bearing material development
[AD-A113518] N82-28649
BERYLLIUM ALLOYS
Materials research for advanced inertial instrumentation. Task 1: Dimensional stability of gyroscope structural materials
[AD-A113497] N82-28273
BESSEL FUNCTIONS
Ascending and asymptotic series for squares, products and cross-products of modified Bessel functions
[AD-A113307] N82-29108
BETA FACTOR
Plasma assessments for the Fusion Engineering Device (FED)
[DE82-004649] N82-29184
BETATRONS
Injection space charge: Enlargements of flux density functioning point choice
[DE82-002299] N82-29131
BIAS
Bias reduction
[AD-A114254] N82-29100
BIBLIOGRAPHIES
Earth Resources: A continuing bibliography with indexes, issue 33
[NASA-SP-7041(33)] N82-28695
A literature survey on inverse scattering for electron density profile determination, volume 2
[AD-A113088] N82-28862
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 232)
[NASA-SP-7011(232)] N82-28984
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 233, June 1982
[NASA-SP-7011(233)] N82-28985
Multivariate analysis and its applications
[AD-A113027] N82-29077
The 10th IFIP Conference on System Modeling and Optimization
[AD-A113126] N82-29104
Scientific and technical information output of the Langley Research Center for Calender year 1981
[NASA-TM-83270] N82-29225
BINARY CODES
EOSMOD: A subroutine package for calculating equations of state and opacities
[DE82-004676] N82-29059
BIOASSAY
Marine sciences group
[DE82-005145] N82-28940
Modification of method for assaying ozone by the diacetyl dihydrolutidine reaction N82-28973
BIOCHEMISTRY
Advanced solar energy research program
[DE82-004791] N82-28813
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Monograph on new direction of chemistry and biology of peptide and protein bioregulators reviewed N82-28979
BIODYNAMICS
Simulation of the motion of the center of mass of an occupant under ejection accelerations
[AD-A113806] N82-28989
Task analysis and the ability requirements of tasks: Collected papers
[AD-A111181] N82-29000
Biomechanical analysis of tasks involving manual materials handling
[AD-A113955] N82-29009
BIOLOGICAL EFFECTS
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 232)
[NASA-SP-7011(232)] N82-28984
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 233, June 1982
[NASA-SP-7011(233)] N82-28985
The biological effects of repeated blasts
[AD-A113113] N82-28990
BIOMASS
Marine sciences group
[DE82-005145] N82-28940
BIOMASS ENERGY PRODUCTION
Alcohol Fuels Program Technical Review, summer, 1981
[DE82-006904] N82-28474
Ethanol production in Suffolk County, New York: Technical and economic feasibility
[PB82-145152] N82-28475
Biomass energy conversion in Hawaii
[DE82-005139] N82-28801
Economic summary of woody biomass direct combustion and gasification alternatives
[DE82-003140] N82-28816
Production of liquid fuels out of plant biomass and refuse: Methods, cost, potential
[IKE-K-68] N82-28838
BIREFRINGENCE
Thermo-optical properties of optical glasses
[DE82-003681] N82-29169
BITUMENS
Rapid hydropyrolysis of sub-bituminous and bituminous coals
[DE82-000776] N82-28469
In-situ coal gasification of bituminous coals. A development plan
[DE82-002558] N82-28471
BIVARIATE ANALYSIS
A bivariate gamma probability distribution with application to gust modeling --- for the ascent flight of the space shuttle
[NASA-TM-82483] N82-29094
BLADE TIPS
The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft
[NASA-CR-137803] N82-28281
BLAST LOADS
The biological effects of repeated blasts
[AD-A113113] N82-28990
BLOOD
Domestic swine in physiological research. 3: Blood gas and acid-base values of arterial and venous blood from young anesthetized pigs maintained under steady-state ventilatory conditions
[AD-A111834] N82-28945

BLOOD CIRCULATION
Reaction to diminished circulating blood volume in individuals who are susceptible and insusceptible to motion sickness (seasickness) N82-28960
BLOOD VOLUME
Reaction to diminished circulating blood volume in individuals who are susceptible and insusceptible to motion sickness (seasickness) N82-28960
BOATTAILS
Surface pressure measurements on a boattailed projectile shape at transonic speeds
[AD-A113520] N82-28258
BODIES OF REVOLUTION
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252
BODY FLUIDS
Effects of low-intensity electromagnetic fields on human and animal erythrocytes N82-28974
BODY-WING CONFIGURATIONS
Calculation of three-dimensional, inviscid supersonic, steady flows
[NASA-CR-3573] N82-28246
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279
Research model wing/tail fabrication --- transonic wind tunnel 1/7.5-scale model
[AD-A114101] N82-28288
BOEING 747 AIRCRAFT
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296
BOILING
The dryout region in frictionally heated sliding contacts
[NASA-TM-82796] N82-28574
Testing of a high capacity research heat pipe
[NASA-CR-167625] N82-28578
BOOMS (EQUIPMENT)
Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
[NASA-CR-3571] N82-28881
BOREHOLES
Multi-frac test series
[DE82-004514] N82-28680
BORIDES
Rare earth boride electron emitter materials fabrication and evaluation
[AD-A113807] N82-29203
BORON
Materials research for advanced inertial instrumentation. Task 2: Gas bearing material development
[AD-A113518] N82-28649
BORON ISOTOPES
Acquisition and performance evaluation of a quadrupole mass spectrometer in a mobile laboratory --- for isotopic analysis
[DE82-004668] N82-28611
BOULES
Improved ingot slicing machine
[NASA-CASE-NPO-15483-1] N82-28642
BOUNDARY INTEGRAL METHOD
Some computational aspects of the boundary collocation method for linear partial differential equations and related questions
[TRITA-NA-8119] N82-29090
BOUNDARY LAYER CONTROL
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249
BOUNDARY LAYER FLOW
Airborne laser turret flow control: A parametric study of wind tunnel model conditions
[AD-A113557] N82-28255
A general method to determine the stability of compressible flows
[NASA-CR-169129] N82-28572
BOUNDARY LAYER TRANSITION
Influence of surface static-pressure orifices on boundary-layer transition --- tests conducted in the Langley Low-Turbulence Pressure Tunnel
[NASA-TM-84492] N82-28248
BOUNDARY VALUE PROBLEMS
Precise determination of the disturbing potential using alternative boundary values
[PB82-150392] N82-28875
A numerical method for analytic continuation of conformal mappings
[TRITA-NA-8118] N82-29089
On the contractivity region of Runge-Kutta methods
[TRITA-NA-8106] N82-29093
Calculation of sound suppression in a circular three-sectioned uniform flow duct
[NLR-TR-81002-U] N82-29120
BRAIN
Nitrogen compound levels in tissues of rat cerebral hemispheres and cerebellum after flight aboard Cosmos-1129 biosatellite N82-28967
BRAIN CIRCULATION
Regulation of cerebral circulation in erect position N82-28957
BRANCHING (MATHEMATICS)
A method for the circulation of invariant manifolds in hydrodynamic stability problems
[PB82-158825] N82-28603
BREADBOARD MODELS
Tent shaped phased array rests
[AD-A113191] N82-28516
Electronically tunable phase locked loop oscillator
[AD-A113253] N82-28556
BREEDER REACTORS
Tokamaks with high-performance resistive magnets: Advanced test reactors and prospects for commercial applications
[DE82-007366] N82-29188
BREEDING (REPRODUCTION)
Cultivation of insects as new branch of entomology - industrial entomology N82-28980
BREMSSTRAHLUNG
On the nonlinear conductivity tensor for an unmagnetized relativistic turbulent plasma
[AD-A113699] N82-29176
BRIGHTNESS TEMPERATURE
Comparison of theoretical and actual satellite microwave brightness temperatures to determine snowpack properties
[PB82-161118] N82-28774
BRINES
Zeta potential study of the water treatment of geothermal brines
[DE82-005910] N82-28849
BRITTLE MATERIALS
Requirements for flexure testing of brittle materials
[AD-A113937] N82-28447
BROADBAND
A broadband waveguide transfer standard for the dissemination of UK national microwave power standards
[RSRE-MEMO-3390] N82-28498
BROADBAND AMPLIFIERS
Integrated balanced FETS for broadband millimeter wave amplifiers
[AD-A107526] N82-28551
BUBBLES
Method of forming frozen spheres in a force-free drop tower
[NASA-CASE-NPO-14845-1] N82-28442
An experimental study of travelling-bubble cavitation noise
[AD-A114107] N82-28587
BUCKLING
Buckling test of a 3-meter-diameter corrugated graphite-epoxy ring-stiffened cylinder
[NASA-TP-2032] N82-28665
BUDGETING
Preliminary analysis of technical risk and cost uncertainty in selected DARPA programs
[AD-A107402] N82-29218
Case studies of innovation in R and D planning
[DE82-901277] N82-29222
BUFFERS (CHEMISTRY)
Wall layer structure and drag reduction: Role of vicous sublayer
[AD-A112980] N82-28581
BUILDINGS
Analysis of data from the energy monitoring and control system at the Norris Cotton Federal Office Building
[PB82-138744] N82-28491
BUOYANCY
Entrainment modelling of buoyant momentum jets in water
[AD-A112797] N82-28580
BUOYS
Aids to navigation principal findings on the CAORF experiment. The performance of visual aids to navigation as evaluated by simulation
[AD-A107045] N82-28271
BURNING RATE
Combustion studies of Very High Burning Rate (VHBR) propellants
[AD-A113029] N82-28485

C

C-141 AIRCRAFT
Delta electrical load analysis C-141B JACC/CP aircraft
[AD-A113761] N82-28283
CABLES (ROPES)
Underwater power source study
[AD-A112644] N82-28792
CADASTRAL MAPPING
Thematic mapper performance N82-28714
CADMIUM SULFIDES
Atmospheric effects on solar-cell calibration and evaluation
[DE82-007370] N82-28825
CALCIUM METABOLISM
Osteoporosis in unsupported extremities N82-28970
CALCIUM OXIDES
Economics of spray-dryer FGD system: The two-stage open-loop processes
[DE82-900158] N82-28846
CALCULUS OF VARIATIONS
High-order terms in sensitivity analysis through a differential approach
[LA-8813-MS] N82-29072
CALDERAS
Elastomechanical methods in the exploration of the Valles Caldera, New Mexico
[DE82-006923] N82-28766
CALIBRATING
Atmospheric effects on solar-cell calibration and evaluation
[DE82-007370] N82-28825
CALIFORNIA
Strategies for steam handling and H2S abatement at geothermal power plants in the geysers area of Northern California
[DE82-001144] N82-28796
Terminal Forecast Reference Notebook, Fresno Air Terminal, California
[AD-A107434] N82-28884
CALORIC STIMULI
Nystagmometry of optovestibular interaction N82-28962
Effect of caloric stimulation of vestibular system on hearing N82-28963
CALORIMETERS
Experimental study of the thermodynamics of thin films and surfaces
[DE82-004887] N82-29215
CAMS
The design of cams for creep testing at constant stress
[NPL-DMA(B)-23] N82-28668
CANADA
Energy in Canada. Review and perspective
[DE81-700548] N82-28837
CANTILEVER BEAMS
Preliminary sizing of vibration absorber for space mast structures
[NASA-TM-84488] N82-28346
CAPACITORS
Saturn 2: Joint project of the CEA and the IN2P3: Detection measurement electrode
[DE82-003204] N82-29133
CARBIDES
A first report on welding diagrams
[PB82-134602] N82-28653
CARBOHYDRATE METABOLISM
Metabolic distinctions related to intake of low-calorie 'survival' rations consisting only of readily assimilated carbohydrates N82-28953
Effect of high ambient temperature on carbohydrate metabolism in rat liver and skeletal muscles N82-28975

CARBON
The high temperature thermochemical properties of carbon
[NASA-TM-84710] N82-28380
Secondary electron yields of carbon-coated and polished stainless steel
[DE82-012762] N82-28426
ion beam sputter deposited diamond like films
[NASA-TM-82873] N82-28445
Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids N82-28788
CARBON COMPOUNDS
Investigations on the nature and reactivity of compounds formed between lithium and carbon black
[AD-A113116] N82-28378
CARBON DIOXIDE
Sinterable powders from laser driven reactions
[AD-A114062] N82-28628
Oil shale project large retort run summary run L-3
[DE82-005109] N82-28764
Geochemical and geophysical models of the fossile-fuel CO2 climate problem
[DE82-005484] N82-28917
CARBON DIOXIDE LASERS
Laser-induced reactions of nitrogen fluorides with nitrogen oxides
[AD-A113667] N82-28626
CO2 laser photoacoustic detection of hydrazine based rocket fuels
[AD-A112950] N82-28632
Inertial fusion program
[DE82-007361] N82-29189
CARBON FIBER REINFORCED PLASTICS
Development of materials and manufacturing technology over the next 20 years: Composite materials
[MBB-UD-341-82-O] N82-28365
CARBON FIBERS
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364
CARBON MONOXIDE
Coupling of transport and chemical processes in catalytic combustion
[DE82-006267] N82-28403
Reduction of carbon monoxide. Past research summary
[DE82-007524] N82-28405
Oil shale project large retort run summary run L-3
[DE82-005109] N82-28764
Effect of vibrational excitation on the dynamics of ion molecule reactions
[DE82-004951] N82-29135
CARBON 13
Rotational analysis of the red system of C-13N-14. Part 2: Wave numbers, term values and constants
[USIP-81-11] N82-29258
CARBONYL COMPOUNDS
Integrated approach to the systematic synthesis, characterization, and catalytic activity of novel heterogeneous catalysts
[DE82-004898] N82-28404
CARDIAC VENTRICLES
Dynamics of left ventricular systolic phase structure during long-term (140-185 days) spaceflights N82-28954
CARIBBEAN SEA
Geology related to acoustic transmission: Eastern Caribbean
[AD-A114430] N82-28938
CARRIER DENSITY (SOLID STATE)
Electrical characterization of silicon produced by electrochemical purification
[DE82-005105] N82-28398
CARRIER MOBILITY
Electrical characterization of silicon produced by electrochemical purification
[DE82-005105] N82-28398
CASCADE FLOW
Computer program for calculating full potential transonic, quasi-three-dimensional flow through a rotating turbomachinery blade row
[NASA-TP-2030] N82-28247
Comparison of laser anemometer measurements and theory in an annular turbine cascade with experimental accuracy determined by parameter estimation
[NASA-TM-82860] N82-28250
Fast generation of three-dimensional computational boundary-conforming periodic grids of C-type --- for turbine blades and propellers
[NASA-CR-165596] N82-28253
Calculation of the unsteady pressure distribution on an oscillating cascade with thick profiles and steady turning angle
[DFVLR-FB-81-38] N82-28600
CASES (CONTAINERS)
TNT equivalency of Cyclotol 70/30
[AD-A113270] N82-28459
CASSEGRAIN ANTENNAS
Cassegrain dual reflector antenna design --- MSAT UHF antenna N82-28336
CASTING
International aviation (selected articles)
[AD-A114422] N82-28245
Texturing polymer surfaces by transfer casting --- cardiovascular prosthesis
[NASA-CASE-LEW-13120-1] N82-28440
Advanced casting: Today and tomorrow --- aerospace industry components casting N82-28486
CATALOGS (PUBLICATIONS)
Local and regional winds: Their names and attributes
[AD-A114224] N82-28908
CATALYSIS
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004180] N82-28390
Photocatalytic hydrogen production from water and intermetallic compound formation on single-crystal surfaces of titanium oxides
[DE82-004952] N82-28393
CATALYSTS
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004179] N82-28388
Chemistry and morphology of coal liquefaction
[DE82-005141] N82-28392
Integrated approach to the systematic synthesis, characterization, and catalytic activity of novel heterogeneous catalysts
[DE82-004898] N82-28404
Conversion of hydrocarbons for fuel cell applications. Part 1: Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids. Part 2: Steam reforming of n-hexane on pellet and monolithic catalyst beds
[NASA-CR-169134] N82-28787
Steam reforming of n-hexane on pellet and monolithic catalyst beds. A comparative study on improvements due to heat transfer N82-28789
CATALYTIC ACTIVITY
An SCF-X alpha-SW molecular-orbital study of a possible reaction path for Ziegler-Natta catalysts
[AD-A113559] N82-28373
Coupling of transport and chemical processes in catalytic combustion
[DE82-006267] N82-28403
Integrated approach to the systematic synthesis, characterization, and catalytic activity of novel heterogeneous catalysts
[DE82-004898] N82-28404
Alcohol Fuels Program Technical Review, summer, 1981
[DE82-006904] N82-28474
CATECHOLAMINE
Catecholamines and enzymes of their metabolism in rat myocardium after flight aboard the Cosmos-936 biosatellite N82-28966
CATHODES
High energy density battery lithium thionyl chloride improved reverse voltage design
[AD-A113498] N82-28794
Rare earth boride electron emitter materials fabrication and evaluation
[AD-A113807] N82-29203
CATIONS
Kinetic studies of organochromium (3) cations and their hydrido analog
[DE82-005581] N82-28397
CAUCHY PROBLEM
Schroedinger equation in the quantim field theory with nonlocal
[JINR-E2-80-705] N82-29214
CAVITATION FLOW
An experimental study of travelling-bubble cavitation noise
[AD-A114107] N82-28587
Properties of materials using acoustic waves
[AD-A114124] N82-29113
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation
[TPD-908-720] N82-29116
CAVITIES
Quasi-square hole with optimum shape in an infinite plate subjected in in-plane loading. Optimization of inner and outer boundaries of beams and plates with holes
[AD-A114370] N82-28679
CAVITY RESONATORS
Electronically tunable amplifier technology
[AD-A113193] N82-28555
CEILINGS (METEOROLOGY)
Estimating the tops, bases, and amount of cloudiness from in situ sampling
[AD-A113107] N82-28904
CELESTIAL NAVIGATION
Algorithms for autonomous star identification
[NASA-TM-84789] N82-29031
CELESTIAL REFERENCE SYSTEMS
Algorithms for autonomous star identification
[NASA-TM-84789] N82-29031
CENTER OF GRAVITY
Simulation of the motion of the center of mass of an occupant under ejection accelerations
[AD-A113806] N82-28969
CENTRAL PROCESSING UNITS
Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer
[AD-A112900] N82-28310
CERAMICS
Thermal analysis of SYNROC gel microspheres
[DE82-003472] N82-28399
State of the art and development of nonmetallic materials: Glass, ceramic, graphite
[MBB-509-O] N82-28457
Sinterable powders from laser driven reactions
[AD-A114062] N82-28628
Materials research for advanced inertial instrumentation. Task 2: Gas bearing material development
[AD-A113518] N82-28649
CEREBELLUM
Nitrogen compound levels in tissues of rat cerebral hemispheres and cerebellum after flight aboard Cosmos-1129 biosatellite N82-28967
CESIUM
Radioelement studies in the oceans
[DE82-003705] N82-28942
CHANNEL FLOW
Numerical simulation of wall-bounded turbulent shear flows
[NASA-TM-84259] N82-28577
Acoustic instabilities as a source of turbulence in reduced density channels
[AD-A114275] N82-28592
CHANNEL NOISE
Intermodulation analysis --- MSAT antenna N82-28339
Development of a good-quality speech coder for transmission over noisy channels at 2.4 kb/s
[AD-A114068] N82-28510
CHANNELS (DATA TRANSMISSION)
A class of efficient contention resolution algorithms for multiple access channels --- discrete time multiaccess
[AD-A113840] N82-28512
CHARACTERIZATION
Characterization of solids and surfaces using ion beams and mass spectrometry
[AD-A112904] N82-28376
Local and regional winds: Their names and attributes
[AD-A114224] N82-28908
CHARGE CARRIERS
Electrical characterization of silicon produced by electrochemical purification
[DE82-005105] N82-28398
CHARGE DISTRIBUTION
Measurement of charge and energy spectra of heavy nuclei aboard Cosmos-936 artificial Earth satellite N82-28968

CHARGE EFFICIENCY
Application, sizing, testing and performance of the photovoltaic battery subsystem at Natural Bridges National Monument, Utah
[DE82-007040] N82-28832
CHARGE EXCHANGE
Effect of vibrational excitation on the dynamics of ion molecule reactions
[DE82-004951] N82-29135
CHARGE TRANSFER
Charge transfer spectra and photoelectron emission by solutions
[AD-A114054] N82-29126
CHARGED PARTICLES
Measurement of charge and energy spectra of heavy nuclei aboard Cosmos-936 artificial Earth satellite
N82-28968
Charged particle simulation of fast neutron damage
[AD-A107394] N82-29124
Stability of charged beam propagation through a relativistic hollow electron beam
[AD-A113529] N82-29128
Effect of vibrational excitation on the dynamics of ion molecule reactions
[DE82-004951] N82-29135
CHARM (PARTICLE PHYSICS)
Lifetimes and production properties of charmed particles
[DE82-005302] N82-29140
CHARTS
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745
Hydrogeochemical and stream sediment reconnaissance basic data for Tularosa quadrangle, New Mexico
[DE82-000787] N82-28756
Evolutionary charts of solar activity (calcium plages) as functions of heliographic longitude and time
[UAG-81] N82-29255
CHEBYSHEV APPROXIMATION
The best parameter subset using the Chebychev curve fitting criterion
[AD-A114327] N82-29083
CHEMICAL ANALYSIS
Molybdenum and its analyses
[DE82-007645] N82-28430
Hydrogeochemical and stream sediment reconnaissance basic data for Aztec Qaudrangle, New Mexico
[DE82-000853] N82-28760
Water resources data for West Virginia, water year 1980. Appendix: Coal areas
[PB82-159674] N82-28778
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, part 2
[AD-A113666] N82-28843
CHEMICAL BONDS
Preparation of perfluorinated 1,2,4-oxadiazoles
[NASA-CASE-ARC-11267-2] N82-28353
CHEMICAL COMPOSITION
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004179] N82-28388
Catalytic coal conversion support: Use of laser flash pyrolysis for structural analysis
[DE82-004176] N82-28391
Coupling of transport and chemical processes in catalytic combustion
[DE82-006267] N82-28403
Determination of the effect of composition, structure and electrochemical mass transport properties on adhesion and corrosion inhibition of paint films
[AD-A113975] N82-28448
Radioelement studies in the oceans
[DE82-003705] N82-28942
CHEMICAL ELEMENTS
Tables and graphs of photon-interaction cross sections from 0.1 keV to 100 MeV derived from the LLL evaluated-nuclear-data library
[DE82-004819] N82-29139
CHEMICAL EQUILIBRIUM
Coordination chemistry of several radius-sensitive complexones and applications to lanthanide-actinide separations
[DE82-005547] N82-28396
Application of solidification theory to rapid solidification processing
[AD-A112864] N82-28411
CHEMICAL LASERS
Equipment and tracking test results for the NRL ship-to-ship DF laser transmission experiment
[AD-A113485] N82-28631
The removal of DF (v = 3 and 4) by H and D atoms
[AD-A114436] N82-28635
CHEMICAL PROPERTIES
Characterization of solids and surfaces using ion beams and mass spectrometry
[AD-A112904] N82-28376
CHEMICAL REACTIONS
Preparation of perfluorinated 1,2,4-oxadiazoles
[NASA-CASE-ARC-11267-2] N82-28353
An SCF-X alpha-SW molecular-orbital study of a possible reaction path for Ziegler-Natta catalysts
[AD-A113559] N82-28373
Kinetics of the reverse Deacon reaction
[DE82-005621] N82-28394
Kinetic studies of organochromium (3) cations and their hydrido analog
[DE82-005581] N82-28397
Chemical reactions and properties of organosilicon compounds related to new materials
[AD-A114377] N82-28451
Energy paths in chemical reactions
[AD-A114191] N82-28609
Laser-induced reactions of nitrogen fluorides with nitrogen oxides
[AD-A113667] N82-28626
Numerical simulations of magneto-hydrodynamic chemically reactive flows in three-dimensions on a vector computer
[AD-A113487] N82-29049
CHINA (MAINLAND)
International aviation (selected articles)
[AD-A114422] N82-28245
CHIPS (ELECTRONICS)
Conversion of algorithms to custom integrated circuit devices
[AD-A113822] N82-28553
CHLORINATION
Kinetics of the reverse Deacon reaction
[DE82-005621] N82-28394
CHROMIUM
Kinetic studies of organochromium (3) cations and their hydrido analog
[DE82-005581] N82-28397
CHROMIUM ALLOYS
Stress corrosion cracking of alloy 600
[DE82-901313] N82-28429
Process for recovering chromium and other metals from superalloy scrap
[P..82-145418] N82-28436
CHROMIUM ISOTOPES
Mechanistic chemistry of some transition metal complexes
[DE82-005577] N82-28425
CIRCADIAN RHYTHMS
USSR report. Space biology and aerospace medicine, volume 16, no. 3, May - June 1982
[JPRS-81197] N82-28949
Sleep, circadian cycles of physiological functions and parameters of human work capacity on first day after changing from altered to usual sleep-waking cycle
N82-28951
Synchronization of cardiovascular accidents with physical clocks N82-28956
CIRCUIT BOARDS
Computer-aided design and fabrication of wire-wrap (trademark) type circuit boards: A new symbolism and its implementation
[AD-A113439] N82-28559
Trend inspection station for printed circuit board soler joints, ultrasonic subsystem
[AD-A112918] N82-28655
CIRCUIT BREAKERS
Solar concentrator protective system
[NASA-CASE-NPO-15662-1] N82-28785
CIRCUIT DIAGRAMS
High speed SAW spectrum analyser data handling --- surface acoustic wave (SAW)
[RSRE-MEMO-3450] N82-28546
Technical guidelines for LSI hybrid microcircuits
[AD-A114437] N82-28562
CIRCUIT RELIABILITY
Microwave circuit analysis and synthesis
[AD-A113560] N82-28554
CIRCUITS
Fundamentals of electrical propulsion plant design
[AD-A114423] N82-28561
CITIES
Sight distance requirements at lane closure work zones on urban freeways
[PB82-142290] N82-29240
CIVIL AVIATION
General aviation activity and avionics survey
[AD-A112924] N82-28244
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274
CLADDING
The development of a high average power glass laser source
[AD-A107527] N82-28621
CLAMPS
Damping in structural joints N82-28478
CLASSIFICATIONS
The use of terrain height information for improving the accuracy of classification of LANDSAT data
[RAE-TM-SPACE-297] N82-28696
Misregistration's effects on classification and proportion estimation accuracy N82-28731
Modeling misregistration and related effects on multispectral classification N82-28733
CLEANING
Advanced machinery liquid metal wetting, cleaning and materials compatibility study
[AD-A113294] N82-28480
CLEARANCES
CF6 jet engine performance improvement: High pressure turbine active clearance control
[NASA-CR-165556] N82-28297
CLIMATE
Terrestrial environment (climatic) criteria guidelines for use in aerospace vehicle development
[NASA-TM-82473] N82-28317
Climatology tables for 7 Corps forward areas
[AD-A113034] N82-28902
Wind resource analysis for the Tennessee Valley authority region, volume 1
[DE82-004927] N82-28913
Geochemical and geophysical models of the fossile-fuel CO2 climate problem
[DE82-005484] N82-28917
CLOSED ECOLOGICAL SYSTEMS
Evaluation of engineering foods for closed Ecological Life Support System (CELSS)
[NASA-CR-167626] N82-29003
Nutrition and food technology for a Controlled Ecological Life Support System (CELSS)
[NASA-CR-167392] N82-29004
Evaluation of engineering foods for Controlled Ecological Life Support Systems (CELSS)
[NASA-CR-166359] N82-29006
CLOUDS
Extinction by aerosol clouds of nonspherical particles at arbitrary wavelengths
[AD-A113535] N82-29163
CLOUDS (METEOROLOGY)
Estimating the tops, bases, and amount of cloudiness from in situ sampling
[AD-A113107] N82-28904
Environmental satellite imagery, July 1981
[PN82-156894] N82-28922
Case studies on convective storms, case study 10, 22 July 1975: Mature storm study: A conceptual model synthesized from microphysical and dynamic observations of a multicell thunderstorm
[PB82-159567] N82-28928
CLUMPS
Simplified free-energy calculation for ion-induced heteromolecular nucleation
[NASA-TP-2039] N82-28839
CLUSTER ANALYSIS
Multi-sample cluster analysis with varying parameters using Alkaike's information criterion
[AD-A113422] N82-29080
Empirical comparison of binary and continuous proximity measures for clustering occupational task data
[AD-A112930] N82-29097

COAL
Evaluation of potential processes for recovery of metals from coal ash. Volume 2: Laboratory data and cost estimates
[DE82-005592] N82-28428
Oil shale and coal research FY 1980
[DE82-002825] N82-28751
Analysis of Dense-Phase Fine-Coal Pneumatic Systems
[DE82-010243] N82-28759
Water resources data for West Virginia, water year 1980. Appendix: Coal areas
[PB82-159674] N82-28778
Requirements for the conceptual design of advanced underground coal extraction systems
[NASA-CR-169142] N82-28790

COAL DERIVED GASES
Catalytic coal conversion support: Use of laser flash pyrolysis for structural analysis
[DE82-004176] N82-28391
Evaluation of nonelectrical energy-transmission options
[DE82-000886] N82-28821

COAL DERIVED LIQUIDS
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004179] N82-28388
Catalytic coal conversion support: Use of laser flash pyrolysis for structural analysis
[DE82-004176] N82-28391
Chemistry and morphology of coal liquefaction
[DE82-005141] N82-28392
Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids N82-28788

COAL GASIFICATION
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004179] N82-28388
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004180] N82-28390
Performance assessment of materials and components of the Westinghouse coal gasification process development unit
[DE82-005995] N82-28401
Plant design and economic analysis for solar coal gasification
[DE82-003178] N82-28468
Laboratory-scale simulation of underground coal gasification: Experiment and theory
[DE82-001063] N82-28470
In-situ coal gasification of bituminous coals. A development plan
[DE82-002558] N82-28471
Fossil energy program
[DE82-005947] N82-28824
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE82-004936] N82-28871

COAL LIQUEFACTION
Chemistry and morphology of coal liquefaction
[DE82-005141] N82-28392
Recent progress in major coal liquefaction facilities: Overview Report No. 2
[DE82-004656] N82-28400
Fundamental studies in the conversion of coals to fuels of increased hydrogen content. Volume 1: The chemistry and mechanisms of coal conversion to clean fuel
[DE82-901287] N82-28472
Optimization studies of various coal conversion systems
[DE82-005208] N82-28473
Fossil energy program
[DE82-005947] N82-28824
Potential costs of complying with emission regulations for an indirect coal-liquefaction process
[DE82-001471] N82-28845

COAL UTILIZATION
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689
Evaluation of nonelectrical energy-transmission options
[DE82-000886] N82-28821
Technical and econmic assessment of fluidized-bed-augmented compressed-air energy-storage system. Volume 1: Executive summary
[DE82-001894] N82-28822

COASTAL CURRENTS
Coastal-shelf transport and diffusion
[DE82-005474] N82-28941

COASTAL WATER
Coastal-shelf transport and diffusion
[DE82-005474] N82-28941

COATINGS
Secondary electron yields of carbon-coated and polished stainless steel
[DE82-012762] N82-28426

COAXIAL PLASMA ACCELERATORS
The radial variation of the ionization in a coaxial plasma gun operated under critical velocity conditions
[TRITA-EPP-81-07] N82-29195

COBALT
Mechanistic chemistry of some transition metal complexes
[DE82-005577] N82-28425
Cobalt availability-domestic: A minerals availability system appraisal
[PB82-135435] N82-28438

COBALT ALLOYS
Effects of cobalt on the microstructure of Udimet 700
[NASA-CR-165605] N82-28409
Process for recovering chromium and other metals from superalloy scrap
[PB82-145418] N82-28436

COCKPITS
Electronic/electric technology benefits study --- avionics
[NASA-CR-165890] N82-28243
Flight crewmember workload evaluation
[AD-A114167] N82-29012

CODERS
A PCM encoder for balloon sondes
[INW-8102] N82-28344
A multi-bit rate interface movement compensated multimode coder for video conferencing
[AD-A114121] N82-28527
Discrete control of continuous processes
[AD-A113839] N82-29070

CODING
Telidon Videotex presentation level protocol: Augmented picture description instructions
[CRC-TN-709-E] N82-28499
Praxis text I/O package: An overview of the Praxis routines to handle Text I/O
[DE82-006250] N82-29060
PARSER: A tool for command interpretation
[DE82-006829] N82-29064

COLLAGENS
Condition of rats connective tissue during long-term hypokinesia and in recovery period N82-28969

COLLAPSE
An experimental study of travelling-bubble cavitation noise
[AD-A114107] N82-28587

COLLECTION
Comet dust collection
[TUM-LRT-TB-81/13] N82-29253

COLLOCATION
Some computational aspects of the boundary collocation method for linear partial differential equations and related questions
[TRITA-NA-8119] N82-29090

COLOR
Programming guide for colour graphics on the NORPAK VDP/VGS and VDP/RGS
[AD-A113429] N82-29046

COLORADO
Regional assessment of aquifers for thermal energy storage. Volume 1: Regions 1 through 6
[DE82-002507] N82-28827

COLUMNS (PROCESS ENGINEERING)
Octanol/water partition coefficients and aqueous solubilities of organic compounds
[PB82-141797] N82-28408
Optimization studies of various coal conversion systems
[DE82-005208] N82-28473
Development and construction of separator rods for the double circular guide system (DCS): Circular guide radii R1=0.05/0.75 mm; R2=0.04/0.025 mm
[MBB-UR-534-82-O] N82-29154

COMBUSTION
Monte Carlo calculations of two-dimensional combustor flows
[AD-A113780] N82-28374
Laboratory-scale simulation of underground coal gasification: Experiment and theory
[DE82-001063] N82-28470
Oil shale project large retort run summary run L-3
[DE82-005109] N82-28764

COMBUSTION CHAMBERS
Coupling of transport and chemical processes in catalytic combustion
[DE82-006267] N82-28403

COMBUSTION EFFICIENCY
Effect of outside combustion air on gas furnace efficiency
[AD-A113484] N82-28377

COMBUSTION PRODUCTS
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reacting flows
[NASA-CR-169124] N82-28576
Emission characterization of an alcohol/diesel-pilot fueled compression ignition engine and its heavy-duty diesel counterpart
[PB82-154113] N82-28654

COMET TAILS
Distribution of the magnetic field in Halley's comet tail obtained from the plasma cloud kinetics
[REPT-673] N82-29250

COMETARY ATMOSPHERES
Solar wind magnetic field penetration into cometary ionospheres
[REPT-685] N82-29254

COMETS
Comet dust collection
[TUM-LRT-TB-81/13] N82-29253

COMMAND AND CONTROL
Flight termination system equipment. Volume 1: Antennas and antenna couplers
[AD-A113493] N82-28320
The design, development and application of advanced video and microcomputer-based command and control (C2) systems
[AD-A113742] N82-28511

COMMERCIAL AIRCRAFT
Gust response of commerical jet aircraft including effects of autopilot operation
[NASA-CR-165919] N82-28266

COMMERCIAL ENERGY
Survey of commercial thermal-storage installations in the United States and Canada
[DE82-000131] N82-28797
Weighting factors in the DOE-2 computer program
[DE81-028593] N82-29057

COMMUNICATION
An integrated communications demand model
[PB82-141292] N82-28539

COMMUNICATION EQUIPMENT
Nonlinear system identification technique validation
[AD-A112593] N82-28505
Electronically tunable phase locked loop oscillator
[AD-A113253] N82-28556

COMMUNICATION NETWORKS
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies. Part 1: Executive summary
[NASA-CR-169135] N82-28325
Land Mobile Satellite Service N82-28326
LMSS telecommunication network design N82-28327
Mobile vehicle antenna N82-28329
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report
[NASA-CR-169136] N82-28330
Introduction N82-28331
LMSS communication network design N82-28332
A virtual space video conferencing demonstration system
[AD-A114120] N82-28526
A multi-bit rate interface movement compensated multimode coder for video conferencing
[AD-A114121] N82-28527
Network specifications for a virtual space teleconferencing system
[AD-A114119] N82-28530

COMMUNICATION SATELLITES
Future communication satellite systems and technology trends
[MBB-UB-542-81-O] N82-28322

NASA Adaptive Multibeam Phased Array (AMPA): An application study
[NASA-CR-169125] N82-28503

COMMUNITIES
Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations
[AD-A113672] N82-28841

COMPARISON
Second International Ozone Sonde Intercomparison Conference, 5-20 April 1978
[ISSN-0012-4130] N82-28858

COMPLEX COMPOUNDS
Coordination chemistry of several radius-sensitive complexones and applications to lanthanide-actinide separations
[DE82-005547] N82-28396
Integrated approach to the systematic synthesis, characterization, and catalytic activity of novel heterogeneous catalysts
[DE82-004898] N82-28404
Reduction of carbon monoxide. Past research summary
[DE82-007524] N82-28405
Mechanistic chemistry of some transition metal complexes
[DE82-005577] N82-28425

COMPONENT RELIABILITY
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
Fatigue design of machine elements N82-28660
Application, sizing, testing and performance of the photovoltaic battery subsystem at Natural Bridges National Monument, Utah
[DE82-007040] N82-28832

COMPOSITE MATERIALS
Research study to define the critical failure mechanisms in notched composites under compression fatigue loading
[AD-A113654] N82-28356
Fifteen years experience with composite propeller blades — for hovercraft N82-28363
Production of improved silicon carbide filaments for composite materials
[PB82-138256] N82-28366
Materials research for advanced inertial instrumentation. Task 2: Gas bearing material development
[AD-A113518] N82-28649
Quality control and nondestructive evaluation techniques for composites. Part 7: Thermography: A state-of-the-art review
[AD-A114392] N82-28657
Recent develoments in hygrothermoviscoelastic analysis of composites N82-28676
Constitutive relations of randomly oriented steel fiber reinforced concrete under multiaxial compressive loadings
[AD-A114168] N82-28678

COMPOSITE STRUCTURES
National Transonic Facility (NTF) prototype fan blade fatigue test
[AD-A114405] N82-28261
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364

COMPRESSED AIR
Technical and econmic assessment of fluidized-bed-augmented compressed-air energy-storage system. Volume 1: Executive summary
[DE82-001894] N82-28822
Conceptual design and engineering studies of adiabatic Compressed Air Energy Storage (CAES) with thermal energy storage
[DE82-005483] N82-28823

COMPRESSIBILITY
Study of turbulent boundary layers over rough surfaces with emphasis n the effects of roughness character and Mach number
[AD-A114217] N82-28588

COMPRESSIBLE BOUNDARY LAYER
Finite-difference solution of the compressible stability eignevalue problem
[NASA-CR-3584] N82-28573

COMPRESSIBLE FLOW
A general method to determine the stability of compressible flows
[NASA-CR-169129] N82-28572
VNAP2: A computer program for computation of two-dimensional, time-dependent, compressible, turbulent flow
[NASA-CR-169103] N82-28596

COMPRESSION LOADS
Damage development mechanisms in notched graphite epoxy composite laminates during compressive fatigue loading
[PB82-142316] N82-28367

COMPRESSIVE STRENGTH
Research study to define the critical failure mechanisms in notched composites under compression fatigue loading
[AD-A113654] N82-28356

COMPRESSOR BLADES
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296

COMPTON EFFECT
Compton effect in the SPS: Its application in beam profile measurement
[DE82-002534] N82-29136
Comptonization of photons in compact cosmic X-ray sources
[MPI-PAE/EXTRATERR-171] N82-29171

COMPUTATION
Finite birth-and-death models in randomly changing environments
[AD-A114188] N82-29102

COMPUTATIONAL FLUID DYNAMICS
Calculation of three-dimensional, inviscid supersonic, steady flows
[NASA-CR-3573] N82-28246
Computer program for calculating full potential transonic, quasi-three-dimensional flow through a rotating turbomachinery blade row
[NASA-TP-2030] N82-28247
Viscous effect on airfoils for unsteady transonic flows
[NASA-CR-166335] N82-28251
Fast generation of three-dimensional computational boundary-conforming periodic grids of C-type — for turbine blades and propellers
[NASA-CR-165596] N82-28253
Computational aerodynamics at Weapons Systems Research Laboratory
[AD-A112867] N82-28257
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263
Calculation of the unsteady pressure distribution on an oscillating cascade with thick profiles and steady turning angle
[DFVLR-FB-81-38] N82-28600

COMPUTER AIDED DESIGN
Computational aerodynamics at Weapons Systems Research Laboratory
[AD-A112867] N82-28257
Dual-shaped reflector design N82-28337
Computer-aided injection molding system
[PB82-147810] N82-28490
Computer-assisted circuit design masks for the production of microwave circuits
[PB82-140153] N82-28494
Computer-aided design and fabrication of wire-wrap (trademark) type circuit boards: A new symbolism and its implementation
[AD-A113439] N82-28559
Technical guidelines for LSI hybrid microcircuits
[AD-A114437] N82-28562
The optimal design of involute gear teeth with unequal addenda
[NASA-TM-82866] N82-28645
Fatigue design of machine elements N82-28660
Analysis of measured structural frequency response data N82-28675
The 10th IFIP Conference on System Modeling and Optimization
[AD-A113126] N82-29104

COMPUTER AIDED MANUFACTURING
Computer-aided injection molding system
[PB82-147810] N82-28490
Computer-aided design and fabrication of wire-wrap (trademark) type circuit boards: A new symbolism and its implementation
[AD-A113439] N82-28559

COMPUTER DESIGN
Optimixing synchronous systems
[AD-A113916] N82-29015

COMPUTER GRAPHICS
Teldon Videotex presentation level protocol: Augmented picture description instructions
[CRC-TN-709-E] N82-28499
Systems Technology Laboratory (STL) compendium of utilities
[NASA-TM-84799] N82-29034
Programming guide for colour graphics on the NORPAK VDP/VGS and VDP/RGS
[AD-A113429] N82-29046
BGRAPH: A program for biplot multivariate graphics. Version 1: User's guide
[AD-A114449] N82-29051

COMPUTER NETWORKS
ADA on multiple processors
[RSRE-MEMO-3464] N82-29019
Future computing
[RAND/P-6680] N82-29020
Decentralized resource management in distributed computer systems
[AD-A113255] N82-29069

COMPUTER PROGRAMMING
High resolution spectral absorption in the short wavelength wing of the 2.7-micrometer water band at 1,000 K
[AD-A114156] N82-28383
Automated torsion pendulum: Control and data collection/reduction using a desktop computer
[AD-A113038] N82-28670
An intelligent control strategy for computer consultation
[AD-A113388] N82-29016
ADA on multiple processors
[RSRE-MEMO-3464] N82-29019
Automated collection of software engineering data in the Software Engineering Laboratory (SEL)
[NASA-TM-84766] N82-29043
The last whole errata catalog
[AD-A112929] N82-29044
Programming guide for colour graphics on the NORPAK VDP/VGS and VDP/RGS
[AD-A113429] N82-29046
Software maintenance: Improvement through better development standards and documentation
[AD-A113257] N82-29047
Software Engineering Principles
[AD-A113415] N82-29048
Praxis text I/O package: An overview of the Praxis routines to handle Text I/O
[DE82-006250] N82-29060
PARSER: A tool for command interpretation
[DE82-006829] N82-29064
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260

COMPUTER PROGRAMS
Computer program for calculating full potential transonic, quasi-three-dimensional flow through a rotating turbomachinery blade row
[NASA-TP-2030] N82-28247
Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309
Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer
[AD-A112900] N82-28310
An analysis of solid propellant transient viscoelastic response under motor ignition conditions
[AD-A114345] N82-28467
Geotechnical computer program survey
[AD-A114106] N82-28481
Computerized, Instrumented, Residential Analysis (CIRA)
[DE82-004560] N82-28484
Coupled walls in earthquake-resistant building: Parametric investigation and design procedure
[PB82-147901] N82-28487
Structural walls in earthquake-resistant buildings: Dynamic analysis of isolated structural walls. Development of design procedure: Design force levels
[PB82-147794] N82-28488
Computer program description: An improved finite element program for three-dimensional electromagnetic problems
[PB82-134636] N82-28541

Finite-difference solution of the compressible stability eignevalue problem
[NASA-CR-3584] N82-28573
Solving the Navier-Stokes equations with LSODI and the method of lines
[DE82-006179] N82-28594
Mini raster-to-vector conversion
[AD-A113004] N82-28742
Dynamic analysis and simulation of a large scale thermal simulator
[DE82-005588] N82-28802
Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations
[AD-A113672] N82-28841
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE82-004936] N82-28871
Program maintenance manual polar ice forecast subsystem: Arctic
[AD-A114343] N82-28933
FORTRAN static source code analyzer (SAP) user's guide
[NASA-TM-84786] N82-29021
System description of the IMP-16C microprocessor orbit determination program
[NASA-TM-84802] N82-29023
Orbit determination software development for microprocessor based systems: Evaluation and recommendations
[NASA-TM-84794] N82-29028
Automated Orbit Determination System (AODS) requirements definition and analysis
[NASA-TM-84795] N82-29030
Mathematical specifications of the Onboard Navigation Package (ONPAC) simulator (revision 1)
[NASA-TM-84797] N82-29033
Automated Orbit Determination System (AODS) environment simulator for prototype testing (ADEPT) system description
[NASA-TM-84801] N82-29035
Preliminary Automated Orbit Determination System (AODS)/AODS environment simulator for prototype testing (ADEPT) user's guide
[NASA-TM-84798] N82-29036
GPSPAC/LANDSAT-D Interface (GLI) system user's guide
[NASA-TM-84784] N82-29038
System description for the Global Positioning Subsystem Experiment Package (GPSPAC) Experiment Data Preprocessor (GEDAP)
[NASA-TM-84785] N82-29039
FORTRAN static source code analyzer program (SAP) user's guide, revision 1
[NASA-TM-84791] N82-29041
Establishment of the Data and Analysis Center for Software (DACS)
[AD-A113262] N82-29045
BGRAPH: A program for biplot multivariate graphics. Version 1: User's guide
[AD-A114449] N82-29051
Computer support to NORDA codes 520 and 530
[AD-A114371] N82-29052
Program listings for EOSAEL 80-B and ancillary codes AGAUS and FLASH. Volume 2: User's manual supplement
[AD-A114417] N82-29054
INPUTP (general purpose input processor). User guide
[AD-A114257] N82-29055
FORTRAN 4 program for calculating X-ray powder diffraction patterns version 9/10
[DE82-003893] N82-29062
PARSER: A tool for command interpretation
[DE82-006829] N82-29064
Program package for solving linear optimization problems. User's manual
[DE81-700125] N82-29065
Industrial machinery noise impact modeling, volume 1
[PB82-148099] N82-29121
Industrial machinery noise impact modelling. Volume 2: Appendices
[PB82-148107] N82-29122
MHD stability analysis code ERATO-J. User's manual of JAERI version ERATO
[DE81-700373] N82-29191
Toroidal plasma MHD equilibrium code EQUCIR version 1
[DE81-700128] N82-29193
Historical inflation program. A computer program generating historical inflation indices for Army aircraft
[AD-A114053] N82-29232

COMPUTER SYSTEMS DESIGN
An intelligent control strategy for computer consultation
[AD-A113388] N82-29016
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
Systems Technology Laboratory (STL) library methods and procedures
[NASA-TM-84787] N82-29032
Distributed operating system design study, volume 1
[AD-A113172] N82-29067
Distributed operating system design study, volume 2
[AD-A113173] N82-29068

COMPUTER SYSTEMS PROGRAMS
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) MODCOMP device and MAX 4 dependency study
[NASA-TM-84796] N82-29027
Establishment of the Data and Analysis Center for Software (DACS)
[AD-A113262] N82-29045

COMPUTER TECHNIQUES
Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309
The shock and vibration digest, volume 14, no. 5
[AD-A115091] N82-28659
Applied stress determination using computerized ultrasonic techniques
[DE82-003894] N82-28681
Proceedings of the 1980 CERN School of Computing
[CERN-81-03] N82-29017

COMPUTERIZED SIMULATION
Aids to navigation principal findings on the CAORF experiment. The performance of visual aids to navigation as evaluated by simulation
[AD-A107045] N82-28271
A simulation system for validating the analytical prediction of performance of the convolutional encoded and symbol interleaved TDRSS S-band return link service in a pulsed RFI environment
[NASA-CR-170428] N82-28500
An integrated communications demand model
[PB82-141292] N82-28539
Numerical simulation of wall-bounded turbulent shear flows
[NASA-TM-84259] N82-28577
Development of a RELAP model for the Barstow thermal-storage subsystem
[DE82-006828] N82-28819
Users manual for polar ice forecast subsystem: Arctic
[AD-A114351] N82-28932
Simulation of the motion of the center of mass of an occupant under ejection accelerations
[AD-A113806] N82-28989
Automated Orbit Determination System (AODS) environment simulator for prototype testing (ADEPT) system description
[NASA-TM-84801] N82-29035
Numerical simulations of magneto-hydrodynamic chemically reactive flows in three-dimensions on a vector computer
[AD-A113487] N82-29049
Virtual memory management
[DE82-000908] N82-29061
PLANNERS' WORKBENCH: A computer aid to the re-planning
[AD-A113331] N82-29219

COMPUTERS
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43)
[B-206064] N82-28264

CONCENTRATION (COMPOSITION)
Molybdenum and its analyses
[DE82-007645] N82-28430
Impregnated filters for the determination of formaldehyde in indoor environments
[DE82-004025] N82-28852
Nitrogen compound levels in tissues of rat cerebral hemispheres and cerebellum after flight aboard Cosmos-1129 biosatellite N82-28967

CONCENTRATORS
Fundamentals and techniques of nonimaging optics for solar-energy concentration
[DE82-004885] N82-28830

CONCRETES
Proceedings of the Conference on Finite Element Methods in South Africa N82-28671
Constitutive relations of randomly oriented steel fiber reinforced concrete under multiaxial compressive loadings
[AD-A114168] N82-28678

CONDENSERS (LIQUIFIERS)
An evaluation of strategies to control noise from air conditioning and refrigeration condensing units
[PB82-165903] N82-28496

CONDUCTIVE HEAT TRANSFER
The effect of heat transfer on the diffusion-limited cathodic reduction of oxygen on steel in flowing 3.2 percent sodium chloride solution
[NPL-DMA(A)-38] N82-28410

CONES
Experimental time-domain determination of complex resonances of simple objects -- radar scattering and target recognition
[AD-A113168] N82-28521

CONFERENCES
Proceedings of the Conference on Finite Element Methods in South Africa N82-28671
Proceedings of the NASA Workshop on Registration and Rectification
[NASA-CR-169133] N82-28699
The organizing of conferences
[PB82-142696] N82-28948
Proceedings of the 1980 CERN School of Computing
[CERN-81-03] N82-29017
Software Engineering Principles
[AD-A113415] N82-29048
Astronomical Society information number 55. Report of the meeting --- conference
[ISSN-0374-1958] N82-29241

CONFORMAL MAPPING
Calculation of three-dimensional, inviscid supersonic, steady flows
[NASA-CR-3573] N82-28246
Map projections for larger-scale mapping N82-28722
A numerical method for analytic continuation of conformal mappings
[TRITA-NA-8118] N82-29089

CONGRESSIONAL REPORTS
Probable impacts of budgets reductions on the development and use of photovoltaic energy systems
[EMD-82-60] N82-28781
NASA authorization for fiscal year 1983
[GPO-91-557] N82-29233

CONICAL BODIES
Study of boundary-layer transition using transonic cone Preston tube data
[NASA-CR-169130] N82-28579

CONNECTIVE TISSUE
Condition of rats connective tissue during long-term hypokinesia and in recovery period N82-28969

CONSTRUCTION
Offset reflector antennas: Design, computation, construction and pattern measurements
[DFVLR-MITT-81-33] N82-28535
Summary of the Northstar home: An extension of the Solar 80 Program
[DE82-004688] N82-28817

CONSULTING
An intelligent control strategy for computer consultation
[AD-A113388] N82-29016

CONTACT RESISTANCE
Rolling resistance of electric vehicle tires from track tests
[NASA-TM-82836] N82-28786

CONTAMINANTS
Effect of defects in aluminum P/M
[AD-A113134] N82-28416
The consequences of hydrazine exposition and its treatment
[MBL-1981-2] N82-28996

Initial stages of oxidation on single crystals of lithium hydride interaction between single crystal lithium hydride and a stainless steel, high vacuum container
[DE82-005614] N82-29212

CONTINENTAL SHELVES
Coastal-shelf transport and diffusion
[DE82-005474] N82-28941
The dynamics of mean circulation on the continental shelf
[PB82-157082] N82-28943

CONTINUITY
Reliability growth of continuous systems
[AD-A114099] N82-28658

CONTINUITY (MATHEMATICS)
A numerical method for analytic continuation of conformal mappings
[TRITA-NA-8118] N82-29089

CONTOURS
Mini raster-to-vector conversion
[AD-A113004] N82-28742

CONTRACTS
The basket method for selecting balanced samples. Part 2: Applications to price estimation
[AD-A112949] N82-29096

CONTROL
A design methodology for nonlinear systems containing parameter uncertainty: Application to nonlinear controller design
[NASA-CR-166358] N82-29005

CONTROL EQUIPMENT
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279
Digital sequential solid-state relay tester
[DE82-004680] N82-28610

CONTROL THEORY
Controllability of inherently damped large flexible space structures
[NASA-CR-169127] N82-28345
Discrete control of continuous processes
[AD-A113839] N82-29070

CONTROL VALVES
Slow opening valve
[NASA-CASE-MSC-20112-1] N82-28641

CONTROLLABILITY
Evaluations of helicopter instrument-flight handling qualities
[AD-A114004] N82-28285
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298

CONTROLLERS
Discrete control of continuous processes
[AD-A113839] N82-29070

CONVECTION
The 1981 summer study program in geophysical fluid dynamics at the Woods Hole Oceanographic Institution physics of convection
[AD-A114366] N82-28590

CONVECTION CURRENTS
Case studies on convective storms, case study 10, 22 July 1975: Mature storm study: A conceptual model synthesized from microphysical and dynamic observations of a multicell thunderstorm
[PB82-159567] N82-28928

CONVECTIVE FLOW
Experimental heat transfer coefficients for the cooling of oil in horizontal internal forced convective transitional flow
[PB82-142993] N82-28601

CONVECTIVE HEAT TRANSFER
The effect of heat transfer on the diffusion-limited cathodic reduction of oxygen on steel in flowing 3.2 percent sodium chloride solution
[NPL-DMA(A)-38] N82-28410

CONVERGENCE
Acceleration of convergence of vector sequences
[NASA-TM-82931] N82-29075
Unconstrained minimization by interpolation: Rates of convergence
[AD-A114115] N82-29082

CONVERGENT-DIVERGENT NOZZLES
Steady and unsteady transonic flow in a duct with a sudden enlargement
[MPIS-1/1982] N82-28599

CONVEXITY
Multivariate analysis and its applications
[AD-A113027] N82-29077

CONVOLUTION INTEGRALS
Polynomial signals and polynomial transformations
[FUB-28-1981] N82-29066
Inverse of a Laplace transform and its numerical evaluation
[DE82-004667] N82-29085

COOLING
Heat removal from the simulation electrode of a high power log pulse ion source
[DE81-700008] N82-29192

COOLING SYSTEMS
Standard weather data for New Zealand
[DE82-901427] N82-28912

COPOLYMERS
Chemical reactions and properties of organosilicon compounds related to new materials
[AD-A114377] N82-28451

COPPER ALLOYS
Proximity effect in Cu-NbSn composites
[DE82-005449] N82-28361

COPPER ISOTOPES
Mechanistic chemistry of some transition metal complexes
[DE82-005577] N82-28425

CORNEA
Mitotic activity and volume of epithelial cell nuclei of rat cornea following spaceflights in biosatellites N82-28965

CORONAGRAPHS
Solar observations from the P78-1 satellite
[AD-A112873] N82-29257

CORRELATORS
Acoustooptic time-integrating correlators and optoelectronic mixers
[AD-A114149] N82-28548

CORROSION
The role of microorganisms in marine corrosion processes
[AD-A114424] N82-28386
Investigation of corrosion and microstructural properties of high strength aluminum alloys after Jominy testing
[NLR-MP-81004-U] N82-28432

CORROSION PREVENTION
Method of protecting a surface with a silicon-slurry/aluminide coating --- coatings for gas turbine engine blades and vanes
[NASA-CASE-LEW-13343-1] N82-28441

CORROSION TESTS
In-bed corrosion tests of superheater alloys in a 10-square-foot AFBC
[DE82-901346] N82-28427

CORRUGATED SHELLS
Buckling test of a 3-meter-diameter corrugated graphite-epoxy ring-stiffened cylinder
[NASA-TP-2032] N82-28665

COSMIC RAYS
Pioneer 10/11 data analysis of the trapped radiation experiment
[NASA-CR-166360] N82-28312

COST ANALYSIS
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274
Design support of a rare gas halide laser
[AD-A112464] N82-28622
Economic analysis based on land costs of collector spacing in a collector field
[DE82-004519] N82-28820
Photovoltaics and electric utilities --- capital investment and revenue requirement
[DE82-006994] N82-28833
Potential costs of complying with emission regulations for an indirect coal-liquefaction process
[DE82-001471] N82-28845
Integration of processes for wastewater residuals management
[PB82-147992] N82-28854
The basket method for selecting balanced samples. Part 2: Applications to price estimation
[AD-A112949] N82-29096
Miniature interferometer transducer: An optical system description and cost analysis
[DE82-004653] N82-29168
Historical inflation program. A computer program generating historical inflation indices for Army aircraft
[AD-A114053] N82-29232

COST EFFECTIVENESS
Production of liquid fuels out of plant biomass and refuse: Methods, cost, potential
[IKE-K-68] N82-28838
Feasibility of electric vehicles in New Zealand. Appendices
[DE82-901431] N82-29236

COST ESTIMATES
A Rand note: Policy analysis of water management for the Netherlands. Volume 16: Costs for infrastructure tactics
[RAND/N-1500/16-NETH] N82-28692
A Rand note: Policy analysis of water management for the Netherlands. Volume 18: Sedimentation and dredging cost models
[RAND/N-1500/18-NETH] N82-28694
Projected engineering cost estimates for an Ocean Thermal Energy Conversion (OTEC)
[RAND/N-1788-RC] N82-28782
Preliminary analysis of technical risk and cost uncertainty in selected DARPA programs
[AD-A107402] N82-29218

COST REDUCTION
Projected engineering cost estimates for an Ocean Thermal Energy Conversion (OTEC)
[RAND/N-1788-RC] N82-28782

COUETTE FLOW
A general method to determine the stability of compressible flows
[NASA-CR-169129] N82-28572

COUNTERS
Apparatus and process for microbial detection and enumeration
[NASA-CASE-LAR-12709-1] N82-28604

COUPLING
Study of correlations in molecular motion by multiple quantum NMR
[DE82-005650] N82-29144

COVERINGS
Radon diffusion through multilayer earthen covers: Models and simulations
[DE82-001420] N82-29138

CRACK INITIATION
The influence of different types of anodic layers on the fatigue properties of 2024-T3 and 7075-T6 sheet material
[NLR-TR-80077-U] N82-28433
The effect of stress triaxiality on the occurrence of ductile fracture in low strength steels
[DRIC-T-6493] N82-28663
Stress corrosion crack initiation testing of high strength aluminum alloys using tuning fork type specimens
[NLR-TR-81053-U] N82-28686

CRACK PROPAGATION
On microstructural control of near threshold fatigue crack growth in 7000 series aluminum alloys
[AD-A113486] N82-28417
Fatigue properties of quatough steels Fe/4Cr/XMn/0.25C
[DE82-005140] N82-28421
Fatigue crack propagation thresholds for long and short cracks in Rene 95 nickel-base superalloy
[DE82-005135] N82-28422
Influences of gaseous environment on low growth-rate fatigue crack propagation in steels
[DE82-005134] N82-28423
Non-destructive evaluation of defects in structural materials using long-wavelength neutrons
[AD-A113500] N82-28656
Crack velocities in natural rubber
[AD-A114298] N82-28677
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685
Gas-driven fracture propagation
[DE82-003079] N82-28870

CREEP PROPERTIES
Non-destructive evaluation of defects in structural materials using long-wavelength neutrons
[AD-A113500] N82-28656

CREEP TESTS
The design of cams for creep testing at constant stress
[NPL-DMA(B)-23] N82-28668

CRITICAL VELOCITY
The radial variation of the ionization in a coaxial plasma gun operated under critical velocity conditions
[TRITA-EPP-81-07] N82-29195

CROP IDENTIFICATION
Misregistration's effects on classification and proportion estimation accuracy N82-28731
CROP INVENTORIES
USDA registration and rectification requirements N82-28708
CROSS CORRELATION
Inter-image matching N82-28725
CROSSLINKING
Chemical design of elastomeric behavior
[AD-A114335] N82-28454
CRYOGENIC EQUIPMENT
Environmental chamber low temperature cutoff
[DE82-007626] N82-28316
CRYSTAL DEFECTS
Structural and electronic studies of defects in amorphous silicon
[DE82-004477] N82-29213
CRYSTAL DISLOCATIONS
Charged dislocation in ice. 2: Contribution of dielectric relaxation
[AD-A113936] N82-29204
CRYSTAL GROWTH
Preparation of rare earth doped YAG laser materials
[AD-A113608] N82-28623
Case studies on convective storms, case study 10, 22 July 1975: Mature storm study: A conceptual model synthesized from microphysical and dynamic observations of a multicell thunderstorm
[PB82-159567] N82-28928
Preparation of large-diameter GaAs crystals
[AD-A107395] N82-29202
CRYSTAL LATTICES
Crystal and molecular structures of selected organic and organometallic compounds and an algorithm for empirical absorption correction
[DE82-005451] N82-29210
CRYSTAL OSCILLATORS
New sensor concepts: Low cost vibrating beam accelerometer
[AD-A113644] N82-28272
CRYSTAL STRUCTURE
Photocatalytic hydrogen production from water and intermetallic compound formation on single-crystal surfaces of titanium oxides
[DE82-004952] N82-28393
Controlled grain boundary structures in superconductors
[AD-A114243] N82-29208
CRYSTALLINITY
Thermal analysis of SYNROC gel microspheres
[DE82-003472] N82-28399
Enhancement of the stability of common polymeric materials against undersea degradation
[PB82-163015] N82-28458
CRYSTALS
Properties of three-dimensional energetic solids and molecular crystals
[AD-A113764] N82-29205
CUES
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302
CULTIVATION
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Cultivation of insects as new branch of entomology - industrial entomology N82-28980
CURRENT AMPLIFIERS
A dc to dc converter --- raising battery voltage in an ion propulsion system
[NASA-CASE-MFS-25430-1] N82-28550
CURRENT DENSITY
Stability of superconducting ISABELLE dipole magnets
[DE82-006843] N82-29190
CURRENT DISTRIBUTION
Delta electrical load analysis C-141B JACC/CP aircraft
[AD-A113761] N82-28263
CURVE FITTING
Fitting a polynomial to data in the presence of noise
[AD-A112984] N82-29081
The best parameter subset using the Chebychev curve fitting criterion
[AD-A114327] N82-29083
CUTTERS
Improved ingot slicing machine
[NASA-CASE-NPO-15483-1] N82-28642
CYBERNETICS
Discrete control of continuous processes
[AD-A113839] N82-29070
CYCLIC COMPOUNDS
Polycyclic high energy oxidizers
[AD-A112585] N82-28446
CYCLIC LOADS
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685
External loads on nozzles in cylindrical shells
[CRIF-MT-146] N82-28687
CYCLONES
Tropical cyclone motion: Environmental interaction plus a Beta effect
[ISSN-0067-0340] N82-28878
Statistical post-processing of the Navy nested tropical cyclone model and the operational tropical cyclone model
[AD-A114150] N82-28911
CYLINDRICAL BODIES
An investigation of the flow about an ogive cylinder at high angles of incidence
[AD-A113356] N82-28256
Experimental time-domain determination of complex resonances of simple objects --- radar scattering and target recognition
[AD-A113168] N82-28521
Thermal relaxation in autofrettaged cylinders
[AD-A113210] N82-28672
Ascending and asymptotic series for squares, products and cross-products of modified Bessel functions
[AD-A113307] N82-29108
CYLINDRICAL PLASMAS
Drift resistive interchange and tearing modes in cylindrical geometry
[AD-A113499] N82-29179
CYLINDRICAL SHELLS
Buckling test of a 3-meter-diameter corrugated graphite-epoxy ring-stiffened cylinder
[NASA-TP-2032] N82-28665
External loads on nozzles in cylindrical shells
[CRIF-MT-146] N82-28687
CYTOGENESIS
Methodological aspects of testing erythrocyte balance by counting incubated reticulocytes N82-28972

D

DAMAGE
A study of the breakdown mechanism of AISI 304 stainless steel, type 2024 aluminum and various titanium coatings
[AD-A113831] N82-28414
DAMPING
Controllability of inherently damped large flexible space structures
[NASA-CR-169127] N82-28345
High temperature damping of dynamic systems N82-28661
DAMS
Powerhouse-gate: Concept definition study
[DE82-006226] N82-28834
DATA ACQUISITION
Advanced trending analysis/EDS data program
[AD-A113511] N82-28286
FACE-2 data reductions and analyses, prior to disclosure of the treatment decisions. Part 1: FACE-2 rain gage rainfall
[PB82-163056] N82-28926
DATA BASES
Inventory of available data elements for the San Bernardino, California region
[NASA-CR-166354] N82-28698
Research program in fully distributed processing systems
[AD-A114199] N82-29018
Automated collection of software engineering data in the Software Engineering Laboratory (SEL)
[NASA-TM-84766] N82-29043
Establishment of the Data and Analysis Center for Software (DACS)
[AD-A113262] N82-29045
Environmental files and data bases. Part A: Introduction and oceanographic management information system
[AD-A113687] N82-29226
Report of Ad Hoc NDAB subgroup --- numerical data
[AD-A112955] N82-29227
Separability as a physical database design methodology
[AD-A114138] N82-29228
Energy data base: Subject thesaurus permutated listing
[DE82-005770] N82-29229
DATA COMPRESSION
Analog data compression for Versatile Experimental Kevlar Array (VEKA) telemetry
[AD-A114324] N82-28343
DATA CONVERSION ROUTINES
Mini raster-to-vector conversion
[AD-A113004] N82-28742
Systems Technology Laboratory (STL) compendium of utilities
[NASA-TM-84799] N82-29034
DATA CONVERTERS
Structured FORTRAN preprocessor (SFORT) PDP-11/70 user's guide
[NASA-TM-84790] N82-29040
DATA CORRELATION
Proceedings of the NASA Workshop on Registration and Rectification
[NASA-CR-169133] N82-28699
Workshop rationale N82-28700
Report of subpanel on inter-image matching N82-28703
Report on the subpanel on remapping procedures N82-28704
Inter-image matching N82-28725
Geometric verification N82-28730
DATA LINKS
A class of efficient contention resolution algorithms for multiple access channels --- discrete time multiaccess
[AD-A113840] N82-28512
An inexpensive 15 MHz fiber optic analog data link
[TRITA-PFU-82-05] N82-29172
DATA MANAGEMENT
Virtual memory management
[SU-SLAC-244] N82-29014
Automated collection of software engineering data in the Software Engineering Laboratory (SEL)
[NASA-TM-84766] N82-29043
Autonomous scheduling technology for Earth orbital missions
[NASA-CR-168939] N82-29217
Report of Ad Hoc NDAB subgroup --- numerical data
[AD-A112955] N82-29227
DATA PROCESSING
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294
Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer
[AD-A112900] N82-28310
Analysis of data from the energy monitoring and control system at the Norris Cotton Federal Office Building
[PB82-138744] N82-28491
Registration and rectification needs of geology N82-28710
Comparison of theoretical and actual satellite microwave brightness temperatures to determine snowpack properties
[PB82-161118] N82-28774
Preliminary results of line sensor test
[AD-A114313] N82-28939
Proceedings of the 1980 CERN School of Computing
[CERN-81-03] N82-29017
Evaluation of the IMP-16 microprocessor orbit determination system filter
[NASA-TM-84788] N82-29026
System description for the Global Positioning Subsystem Experiment Package (GPSPAC) Experiment Data Preprocessor (GEDAP)
[NASA-TM-84785] N82-29039
Virtual memory management
[DE82-000908] N82-29061

Distributed operating system design study, volume 1
[AD-A113172] N82-29067
Distributed operating system design study, volume 2
[AD-A113173] N82-29068

DATA PROCESSING EQUIPMENT
Advanced electronic technology
[AD-A114319] N82-28563
Implementation of information technology in office settings: Review of relevant literature
[RAND-P-6697] N82-29224

DATA REDUCTION
Automated torsion pendulum: Control and data collection/reduction using a desktop computer
[AD-A113038] N82-28670
Photogrammetric aspects of remapping procedures N82-28726
Current status of metric reduction of (passive) scanner data N82-28739
Feasibility of B spline data reduction on remote sensing data
[NLR-TR-80023-U] N82-28767
FACE-2 data reductions and analyses, prior to disclosure of the treatment decisions. Part 1: FACE-2 rain gage rainfall
[PB82-163056] N82-28926
Classification of data sets
[BMVG-FBWT-80-17] N82-29103
Pioneer 10/11 data analysis of the magnetic field experiment
[NASA-CR-166366] N82-29251

DATA SAMPLING
Report of the subpanel on resampling functions N82-28705
Multi-sample cluster analysis with varying parameters using Alkaike's information criterion
[AD-A113422] N82-29080

DATA STORAGE
Virtual memory management
[SU-SLAC-244] N82-29014
Numerical simulations of magneto-hydrodynamic chemically reactive flows in three-dimensions on a vector computer
[AD-A113487] N82-29049
Virtual memory management
[DE82-000908] N82-29061

DATA SYSTEMS
High speed SAW spectrum analyser data handling --- surface acoustic wave (SAW)
[RSRE-MEMO-3450] N82-28546
Proceedings of the NASA Workshop on Registration and Rectification
[NASA-CR-169133] N82-28699
Data vs. information: A system paradigm N82-28732
Establishment of the Data and Analysis Center for Software (DACS)
[AD-A113262] N82-29045

DATA TRANSMISSION
Telidon Videotex presentation level protocol: Augmented picture description instructions
[CRC-TN-709-E] N82-28499
IRIG-Time synchronized binary video data inserter
[AD-A107119] N82-28506

DECISION MAKING
Are robustness measures robust --- quantification and optimization of decision making in solving policy problems
[RAND/P-6734] N82-29073
PLANNERS' WORKBENCH: A computer aid to the re-planning
[AD-A113331] N82-29219

DECISION THEORY
Decision algorithms for multiplayer games of incomplete information
[AD-A114334] N82-29053

DEFECTS
The relationship between ballistic behavior and structural microdefects of T propellant. An application of SEM in the study of doublebase propellant
[AD-A114381] N82-28351
Anisotropic embrittlement in high-hardness ESR 4340 steel forgings
[AD-A113906] N82-28412

DEFENSE PROGRAM
Concepts, the Journal of Defense Systems Acquisition Management, Autumn 1981, volume 4, number 4
[AD-A113130] N82-29220

DEFLECTORS
The use of a deflectable nose on a missile as a control device
[AD-A112179] N82-28319

DEFORMATION
Materials research for advanced inertial instrumentation. Task 1: Dimensional stability of gyroscope structural materials
[AD-A113497] N82-28273
Coupled walls in earthquake-resistant building: Parametric investigation and design procedure
[PB82-147901] N82-28487
Structural walls in earthquake-resistant buildings: Dynamic analysis of isolated structural walls. Development of design procedure: Design force levels
[PB82-147794] N82-28488

DEGREES OF FREEDOM
Six-degree-of-freedom (6-DOF) simulator for weapon testing
[AD-A113536] N82-28308

DELTA WINGS
The attached flow over a slender delta wing with leading-edge flaps
[RAE-TR-81150] N82-28254

DEMAND (ECONOMICS)
An integrated communications demand model
[PB82-141292] N82-28539

DENMARK
Occurrences of the polar slant E condition (SEC) at Narssarssuaq, Godhavn, Thule, Denmark for 1980 N82-28873

DENSITY (MASS/VOLUME)
High energy density battery lithium thionyl chloride improved reverse voltage design
[AD-A113498] N82-28794

DEPOSITION
Ion beam sputter deposited diamond like films
[NASA-TM-82873] N82-28445

DEPOSITS
Basic study of fuel storage stability
[AD-A114127] N82-28466

DEPTH
Monitoring technologies for ocean disposal of radioactive waste
[RAND/R-2773-NOAA] N82-29146

DEPTH MEASUREMENT
The choice of a laser for airborne depth sounding
[AD-A112901] N82-28629
Evaluation of the performance of a laser for airborne depth sounding
[AD-A112907] N82-28630
Laser hydrography in Australia
[AD-A113584] N82-28741

DESIGN ANALYSIS
The determination of gust loads on nonlinear aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28303
Design basis for a new transonic wind tunnel
[AD-A112899] N82-28311
Micro-g triaxial piezoelectric satellite accelerometer system development
[AD-A113849] N82-28347
An optimal design of simple symmetric laminates under the first ply failure criteria
[AD-A113689] N82-28357
Advanced casting: Today and tomorrow --- aerospace industry components casting N82-28486
Design support of a rare gas halide laser
[AD-A112464] N82-28622
Requirements for the conceptual design of advanced underground coal extraction systems
[NASA-CR-169142] N82-28790
Preliminary conceptual design for geothermal space heating conversion of school district 50 joint facilities at Pagosa Springs, Colorado. GTA report no. 6
[DE82-005245] N82-28800
Design studies for concentrating photovoltaic arrays
[DE82-005113] N82-28812
A design study for a meteorological instrumentation system for an Omega tower
[AD-A112868] N82-28906
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
Distributed operating system design study, volume 1
[AD-A113172] N82-29067
Distributed operating system design study, volume 2
[AD-A113173] N82-29068

DESORPTION
Quantitative thermal desorption spectrometry of noble gases in solids N82-28369
Quantitative thermal description spectrometry of ionically implanted inert gases. 1: Fundamental aspects N82-28370
Quantitative thermal desorption spectrometry of ionically implanted inert gases. 2: Technical requirements N82-28371
Laser-generated electron emission from surfaces: Effect of the pulse shape on temperature and transient phenomena
[AD-A114282] N82-28633

DESULFURIZING
Economics of spray-dryer FGD system: The two-stage open-loop processes
[DE82-900158] N82-28846

DETECTION
Photoelectric detection system --- manufacturing automation
[NASA-CASE-MFS-23776-1] N82-28545
Apparatus and process for microbial detection and enumeration
[NASA-CASE-LAR-12709-1] N82-28604
The digital step edge N82-28724
Variability and sensitivity of coupled mixed layer acoustic model systems
[AD-A114302] N82-29123
Saturn 2: Joint project of the CEA and the IN2P3: Detection measurement electrode
[DE82-003204] N82-29133

DETERGENTS
Fire extinguishing tests -80 with methyl alcohol gasoline
[SP-RAPP-1981:20] N82-28485

DETONATION WAVES
Model of direct initiation of unconfined detonations
[AD-A107446] N82-28508

DETONATORS
TNT equivalency of Cyclotol 70/30
[AD-A113270] N82-28459
Electrothermal analytical response inspection of electroexplosive devices
[AD-A112328] N82-28461

DEUTERIUM
Kinetic studies of organochromium (3) cations and their hydrido analog
[DE82-005581] N82-28397
Thermotransport of hydrogen and deuterium in vanadium, niobium and tantalum alloys
[DE82-005453] N82-28424
NMR studies of oriented molecules
[DE82-005258] N82-29134

DEUTERIUM FLUORIDES
The removal of DF (v = 3 and 4) by H and D atoms
[AD-A114436] N82-28635

DEXTRANS
Electrocatalysis of the oxidations of some organic compounds on noble-metal electrodes by foreign-metal ad-atoms
[DE82-005619] N82-28406

DIAGNOSIS
Modeling temperature data: An illustration of the use of biplots and bimodels in nonlinear modeling
[AD-A114169] N82-28907

DIAGRAMS
A first report on welding diagrams
[PB82-134602] N82-28653

DIATOMIC MOLECULES
Molecular reaction rates
[AD-A114342] N82-29130

DICHLORIDES
Studies in chemical reactivity
[DE82-006891] N82-28407

DIELECTRIC PROPERTIES
Charged dislocation in ice. 2: Contribution of dielectric relaxation
[AD-A113936] N82-29204

DIELECTRICS
Buried insulated antennas
[RSRE-MEMO-3418] N82-28497

DIESEL ENGINES
Emission characterization of an alcohol/diesel-pilot fueled compression ignition engine and its heavy-duty diesel counterpart
[PB82-154113] N82-28654

Survey of diesel generation by small US utilities
[DE82-901291] N82-28798
DIESEL FUELS
Basic study of fuel storage stability
[AD-A114127] N82-28466
Emission characterization of an alcohol/diesel-pilot fueled compression ignition engine and its heavy-duty diesel counterpart
[PB82-154113] N82-28654
DIFFERENCE EQUATIONS
Error propagation in stiff differential systems of singular perturbation type
[TRITA-NA-8108] N82-29091
DIFFERENTIAL CALCULUS
Error propagation in stiff differential systems of singular perturbation type
[TRITA-NA-8108] N82-29091
DIFFERENTIAL EQUATIONS
Error propagation in stiff differential systems of singular perturbation type
[TRITA-NA-8108] N82-29091
Multiple step G-contractivity with applications to slowly varying linear systems
[TRITA-NA-8107] N82-29092
DIFFRACTION PATTERNS
Dual-shaped reflector design N82-28337
Multiple beam offset antenna design processes --- MSAT antenna N82-28340
FORTRAN 4 program for calculating X-ray powder diffraction patterns version 9/10
[DE82-003893] N82-29062
DIGITAL COMPUTERS
Six-degree-of-freedom (6-DOF) simulator for weapon testing
[AD-A113536] N82-28308
DIGITAL DATA
The digital step edge N82-28724
Computational aspects of remapping digital imagery N82-28727
A quantitative assessment of resampling errors N82-28728
DIGITAL FILTERS
Report of the subpanel on resampling functions N82-28705
DIGITAL RADAR SYSTEMS
FACE-2 data reductions and analyses, prior to disclosure of the treatment decisions. Part 1: FACE-2 rain gage rainfall
[PB82-163056] N82-28926
DIGITAL TECHNIQUES
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689
A discussion of image sharpness N82-28723
DIODES
Arrangement for damping the resonance in a laser diode
[NASA-CASE-NPO-15980-1] N82-28618
DIRECT CURRENT
Fundamentals of electrical propulsion plant design
[AD-A114423] N82-28561
DISCRETE ADDRESS BEACON SYSTEM
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274
DISCRIMINANT ANALYSIS (STATISTICS)
Classification of data sets
[BMVG-FBWT-80-17] N82-29103
DISPERSING
Electron beam transport in the ionosphere: Energy deposition and optical emissions based upon the combined effects of plasma turbulence and particle-particle interactions
[AD-A114376] N82-28868
DISPLAY DEVICES
Electronic/electric technology benefits study --- avionics
[NASA-CR-165890] N82-28243
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294
Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309
A virtual space video conferencing demonstration system
[AD-A114120] N82-28526
Visual Technology Research Simulator (VTRS) human performance research: Phase 3
[AD-A112475] N82-28988
Unconventional visual displays for flight training
[AD-A111392] N82-28999
Liquid crystal materials for matrix displays
[AD-A114444] N82-29207
DISSOCIATION
Effect of vibrational excitation on the dynamics of ion molecule reactions
[DE82-004951] N82-29135
DISTRIBUTED PARAMETER SYSTEMS
Research program in fully distributed processing systems
[AD-A114199] N82-29018
DISTRIBUTION FUNCTIONS
Auroral particle distribution functions and their relationships to inverted Vs and auroral arcs
[AD-A114365] N82-28867
Multivariate analysis and its applications
[AD-A113027] N82-29077
DISTURBING FUNCTIONS
Precise determination of the disturbing potential using alternative boundary values
[PB82-150392] N82-28875
DIURNAL VARIATIONS
Mathematical models of water yield with particular reference to Mississippi watersheds. Mathematical modeling of watershed yield
[PN82-157868] N82-28772
Revised Uniform Summary of Surface Weather Observations (RUSSWO): Bangor International/Dow AFB, Maine. Parts A-F
[AD-A113178] N82-28896
DOCUMENTATION
Automated collection of software engineering data in the Software Engineering Laboratory (SEL)
[NASA-TM-84766] N82-29043
Scientific and technical information output of the Langley Research Center for Calender year 1981
[NASA-TM-83270] N82-29225
DOMAINS
On the contractivity region of Runge-Kutta methods
[TRITA-NA-8106] N82-29093
DOMES (STRUCTURAL FORMS)
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624
DOMESTIC ENERGY
National solar data program performance results, volume 4
[DE82-002536] N82-28808
DONOR MATERIALS
Recent progress in major coal liquefaction facilities: Overview report No. 2
[DE82-004656] N82-28400
DOPPLER EFFECT
Method and apparatus for Delta K synthetic aperature radar measurement of ocean current
[NASA-CASE-NPO-15704-1] N82-28502
DOPPLER NAVIGATION
Evaluation of various navigation system concepts
[AD-A112919] N82-28275
The two-way TDRSS observation model for the LSI-11/23 microcomputer
[NASA-TM-84793] N82-29029
DOSIMETERS
Design, fabrication, calibration, testing and satellite integration of a space radiation dosimeter
[AD-A113085] N82-28348
Dimensions/NBS, volume 65, number 7, September 1981
[PB82-156692] N82-29230
DOUBLE BASE PROPELLANTS
The relationship between ballistic behavior and structural microdefects of T propellant. An application of SEM in the study of doublebase propellant
[AD-A114381] N82-28351
DRAG MEASUREMENT
Measurement methods for fluid shear stress
[AD-A113020] N82-28582
DRAG REDUCTION
Wall layer structure and drag reduction: Role of vicous sublayer
[AD-A112980] N82-28581
DRIFT (INSTRUMENTATION)
Automatic and continuous transducer-drift compensator for endpoint detection systems
[PB82-135534] N82-28614
DRIFT RATE
The dynamics of mean circulation on the continental shelf
[PB82-157082] N82-28943
DROP TOWERS
Method of forming frozen spheres in a force-free drop tower
[NASA-CASE-NPO-14845-1] N82-28442
DROPS (LIQUIDS)
Attenuation of large amplitude pressure disturbances by liquid droplets
[AD-A114250] N82-28636
DRY FRICTION
The dryout region in frictionally heated sliding contacts
[NASA-TM-82796] N82-28574
DUCTED FLOW
Steady and unsteady transonic flow in a duct with a sudden enlargement
[MPIS-1/1982] N82-28599
DUCTILITY
The effect of stress triaxiality on the occurrence of ductile fracture in low strength steels
[DRIC-T-6493] N82-28663
DUCTS
Computation of laminar and turbulent flow in 90 deg square duct and pipe bends using the Navier-Stokes equations
[AD-A114258] N82-28589
DUST
Sticking of comet dust to target surfaces
[TUM-LRT-TB-81/1] N82-29252
Comet dust collection
[TUM-LRT-TB-81/13] N82-29253
DYNAMIC CHARACTERISTICS
Audio conferencing using dynamic channel-assignment system
[AD-A114122] N82-28528
Proceedings of the Conference on Finite Element Methods in South Africa N82-28671
Frequency response measurements on Lyman-alpha humidiometers
[AD-A113240] N82-28905
Dynamics of left ventricular systolic phase structure during long-term (140-185 days) spaceflights N82-28954
DYNAMIC RESPONSE
Limiting performance of nonlinear systems with applications to helicopter vibration control problems
[AD-A113239] N82-28301
Simulation of the motion of the center of mass of an occupant under ejection accelerations
[AD-A113806] N82-28989
DYNAMIC STRUCTURAL ANALYSIS
The use of polarographic and potentiometric methods in structural analysis
[DRIC-T-6575] N82-28667

E

E REGION
Occurrences of the polar slant E condition (SEC) at Narssarssuaq, Godhavn, Thule, Denmark for 1980 N82-28873
EAR
Preparation of labyrinthectomied animals for flight aboard Cosmos-936 biosatellite N82-28971
EARTH ATMOSPHERE
Analysis of the atmospheric aerosol size distribution information retrievable from near-limb angular radiance measurements taken on Mauna Loa, Hawaii
[DE82-005999] N82-28851
EARTH MOVEMENTS
Aseismic base isolation N82-28662
EARTH RESOURCES
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689
EARTH RESOURCES PROGRAM
Earth Resources: A continuing bibliography with indexes, issue 33
[NASA-SP-7041(33)] N82-28695
EARTH TERMINAL MEASUREMENT SYSTEM
Earth Terminal Measurement System maintenance manual, addendum
[PB82-151994] N82-28544
EARTHQUAKE RESISTANT STRUCTURES
The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476

Seismic analysis of rotating mechanical systems. A review N82-28479
Coupled walls in earthquake-resistant building: Parametric investigation and design procedure [PB82-147901] N82-28487
Structural walls in earthquake-resistant buildings: Dynamic analysis of isolated structural walls. Development of design procedure: Design force levels [PB82-147794] N82-28488
Aseismic base isolation N82-28662

EARTHQUAKES
Structural walls in earthquake-resistant buildings: Dynamic analysis of isolated structural walls. Development of design procedure: Design force levels [PB82-147794] N82-28488

ECOLOGY
Ecological implications of air pollutants from synthetic-fuels processing [DE82-002792] N82-28844
A design methodology for nonlinear systems containing parameter uncertainty: Application to nonlinear controller design [NASA-CR-166358] N82-29005
Monitoring technologies for ocean disposal of radioactive waste [RAND/R-2773-NOAA] N82-29146

ECONOMETRICS
An integrated communications demand model [PB82-141292] N82-28539

ECONOMIC ANALYSIS
Historical research and development inflation indices for Army fixed and rotor winged aircraft [AD-A114368] N82-28290
Design handbook for photovoltaic power systems. Volume 1: Simplified methods for utility interconnected systems [DE82-003108] N82-28810
Economic analysis of small wind-energy-conversion systems for ten MASEC sites [DE82-003976] N82-28815
Economic summary of woody biomass direct combustion and gasification alternatives [DE82-003140] N82-28816
Economic analysis based on land costs of collector spacing in a collector field [DE82-004519] N82-28820
Evaluation of nonelectrical energy-transmission options [DE82-000886] N82-28821
Economics of spray-dryer FGD system: The two-stage open-loop processes [DE82-900158] N82-28846
Historical inflation program. A computer program generating historical inflation indices for Army aircraft [AD-A114053] N82-29232

ECONOMIC IMPACT
A Rand note: Policy analysis of water management for the Netherlands. Volume 16: Costs for infrastructure tactics [RAND/N-1500/16-NETH] N82-28692

ECOSYSTEMS
Environmental and radiological safety studies. Interaction of Pu-23802 heat sources with terrestrial and aquatic environments [DE82-004681] N82-28848

EDGES
The digital step edge N82-28724

EDITING ROUTINES (COMPUTERS)
Praxis text I/O package: An overview of the Praxis routines to handle Text I/O [DE82-006250] N82-29060

EDUCATION
Software Engineering Principles [AD-A113415] N82-29048
NASA report to educators, volume 10, no. 1 N82-29216
United States Air Force Summer Faculty Research Program. 1981 Program Management report [AD-A113707] N82-29259

EFFECTIVENESS
Efficacy of kavinton in prevention of motion sickness N82-28961

EFFICIENCY
Heat pump operating with a mixture of fluids [PB82-143611] N82-28602
Virtual memory management [DE82-000908] N82-29061

EIGENVALUES
Finite-difference solution of the compressible stability eignevalue problem [NASA-CR-3584] N82-28573

EIGENVECTORS
Summability methods for divergent integrals and their applications to singular Sturm-Liouville expansions [AD-A113077] N82-29079

EJECTION SEATS
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification [AD-A113957] N82-28267
Simulation of the motion of the center of mass of an occupant under ejection accelerations [AD-A113806] N82-28989

ELASTIC MEDIA
Gas-driven fracture propagation [DE82-003079] N82-28870

ELASTIC PROPERTIES
Elastomechanical methods in the exploration of the Valles Caldera, New Mexico [DE82-006923] N82-28766
Ascending and asymptotic series for squares, products and cross-products of modified Bessel functions [AD-A113307] N82-29108

ELASTOMETERS
Threshold tear strength of elastomers [AD-A114239] N82-28452

ELECTRIC ARCS
Analysis of a rail gun plasma accelerator [AD-A114043] N82-29125

ELECTRIC AUTOMOBILES
Rapidly-refuelable 167-CM(2) aluminum-air power cell [DE82-006251] N82-28826

ELECTRIC BATTERIES
Analytical modeling of spacecraft power systems [NASA-CR-166820] N82-28349
Electrochemistry of sulfur dioxide in nonaqueous solutions, part 1 [AD-A113033] N82-28379
Solid-state high common-mode battery cell voltage scanner: Design report [DE82-007032] N82-28569
High energy density battery lithium thionyl chloride improved reverse voltage design [AD-A113498] N82-28794
Design handbook for photovoltaic power systems. Volume 1: Simplified methods for utility interconnected systems [DE82-003108] N82-28810

ELECTRIC BRIDGES
Measurement and use of the plasma current waveform in an RF silane discharge [DE82-005119] N82-28566

ELECTRIC CONDUCTORS
Electrical characterization of silicon produced by electrochemical purification [DE82-005105] N82-28398

ELECTRIC CURRENT
Measurement and use of the plasma current waveform in an RF silane discharge [DE82-005119] N82-28566

ELECTRIC FIELDS
Electric and magnetic fields [NASA-CR-165604] N82-28350
Computer program description: An improved finite element program for three-dimensional electromagnetic problems [PB82-134636] N82-28541

ELECTRIC GENERATORS
Strategies for steam handling and H2S abatement at geothermal power plants in the geysers area of Northern California [DE82-001144] N82-28796
Intermediate photovoltaic system application experiment operational performance report. Volume 3: Mt. Laguna Radar Station, Mt. Laguna, California [DE82-003006] N82-28809
Bicycle 2: A computer code for calculating levelized life-cycle costs [DE82-001865] N82-29058

ELECTRIC MOTOR VEHICLES
Rolling resistance of electric vehicle tires from track tests [NASA-TM-82836] N82-28786
Electric vehicles: Limited range and high costs hamper commercialization [EMD-82-38] N82-29234
Feasibility of electric vehicles in New Zealand. Appendices [DE82-901431] N82-29236

ELECTRIC MOTORS
Feasibility of electric vehicles in New Zealand. Appendices [DE82-901431] N82-29236

ELECTRIC POTENTIAL
Stability of a 100-kV self-firing spark gap [DE82-005718] N82-28570

ELECTRIC POWER PLANTS
Capturing energy from the wind [NASA-SP-455] N82-28783
Survey of diesel generation by small US utilities [DE82-901291] N82-28798
Development of a RELAP model for the Barstow thermal-storage subsystem [DE82-006828] N82-28819

ELECTRIC POWER SUPPLIES
Delta electrical load analysis C-141B JACC/CP aircraft [AD-A113761] N82-28283

ELECTRIC POWER TRANSMISSION
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system [AD-A114026] N82-28552

ELECTRIC PROPULSION
Electric and magnetic fields [NASA-CR-165604] N82-28350
Fundamentals of electrical propulsion plant design [AD-A114423] N82-28561

ELECTRIC RELAYS
Digital sequential solid-state relay tester [DE82-004680] N82-28610

ELECTRICAL MEASUREMENT
Solid-state high common-mode battery cell voltage scanner: Design report [DE82-007032] N82-28569

ELECTRICAL PROPERTIES
Electrical characterization of 64K dynamic rams [AD-A113190] N82-28558
Processing and properties of Zn0 based varistors [DE82-005583] N82-28565

ELECTRICAL RESISTANCE
Drift resistive interchange and tearing modes in cylindrical geometry [AD-A113499] N82-29179

ELECTRICAL RESISTIVITY
Theoretical investigation of absorptive processes [AD-A107278] N82-28507
Turbulent heating and filament structure of field-aligned current with anomaous resistivity [REPT-680] N82-28855
On the nonlinear conductivity tensor for an unmagnetized relativistic turbulent plasma [AD-A113699] N82-29176

ELECTRICITY
Impact of advanced power semiconductor systems on utilities and industry [DE82-901286] N82-28547

ELECTRO-OPTICS
Acoustooptic time-integrating correlators and optoelectronic mixers [AD-A114149] N82-28548
Program listings for EOSAEL 80-B and ancillary codes AGAUS and FLASH. Volume 2: User's manual supplement [AD-A114417] N82-29054
Design and fabrication of multimode optical switches [AD-A113812] N82-29159
Solid state research [AD-A114189] N82-29209

ELECTROCATALYSTS
Electrocatalysis of the oxidations of some organic compounds on noble-metal electrodes by foreign-metal ad-atoms [DE82-005619] N82-28406

ELECTROCHEMICAL CORROSION
Determination of the effect of composition, structure and electrochemical mass transport properties on adhesion and corrosion inhibition of paint films [AD-A113975] N82-28448

ELECTROCHEMICAL OXIDATION
Electrocatalysis of the oxidations of some organic compounds on noble-metal electrodes by foreign-metal ad-atoms
[DE82-005619] N82-28406

ELECTROCHEMISTRY
Silver-doping effects and photostructural transformation in evaporated As2S3 thin films
[AD-A113148] N82-28375
Investigations on the nature and reactivity of compounds formed between lithium and carbon black
[AD-A113116] N82-28378
Electrochemistry of sulfur dioxide in nonaqueous solutions, part 1
[AD-A113033] N82-28379
Sensitized photo-reduction of methyl viologen by metalloporphyrins
[AD-A114443] N82-28381
Electrical characterization of silicon produced by electrochemical purification
[DE82-005105] N82-28398

ELECTRODES
Electrocatalysis of the oxidations of some organic compounds on noble-metal electrodes by foreign-metal ad-atoms
[DE82-005619] N82-28406
Microelectronic electrode probe for testing brain electrical activity N82-28982
Saturn 2: Joint project of the CEA and the IN2P3: Detection measurement electrode
[DE82-003204] N82-29133
Heat removal from the simulation electrode of a high power log pulse ion source
[DE81-700008] N82-29192

ELECTRODYNAMICS
Electrodynamics: A consequence of nonlinear realizations of the Lorentz group
[DE82-004775] N82-28531

ELECTROJETS
Modeling of high-latitude currents in a substorm
[AD-A114311] N82-28865

ELECTROKINETICS
Zeta potential study of the water treatment of geothermal brines
[DE82-005910] N82-28849

ELECTROLYTE METABOLISM
Role of hormonal compounds in regulation of electrolyte metabolism in the presence of emotional stress N82-28952

ELECTROMAGNETIC ACCELERATION
Laboratory demonstration electromagnetic launcher: Preliminary hazard analysis
[AD-A114154] N82-28524

ELECTROMAGNETIC COMPATIBILITY
Electronically tunable phase locked loop oscillator
[AD-A113253] N82-28556

ELECTROMAGNETIC FIELDS
Electrodynamics: A consequence of nonlinear realizations of the Lorentz group
[DE82-004775] N82-28531
The electron avalanche ionization of air and a simple air chemistry model
[AD-A113501] N82-28864
Effects of low-intensity electromagnetic fields on human and animal erythrocytes N82-28974

ELECTROMAGNETIC INTERFERENCE
S-band radar pulse densities in the Los Angeles area
[AD-A114116] N82-28529

ELECTROMAGNETIC PULSES
Evaluation of applicability of standard CW EMI/RFI shielding effectiveness test techniques to assessment of EMP hardness of tactical shelters
[AD-A113042] N82-28517

ELECTROMAGNETIC SCATTERING
Theoretical investigation of absorptive processes
[AD-A107278] N82-28507

ELECTROMAGNETIC SHIELDING
Evaluation of applicability of standard CW EMI/RFI shielding effectiveness test techniques to assessment of EMP hardness of tactical shelters
[AD-A113042] N82-28517

ELECTROMAGNETIC WAVE TRANSMISSION
Electromagnetic wave trajectories at VHF and higher frequencies
[PB82-134289] N82-28538

ELECTROMECHANICAL DEVICES
Advanced machinery liquid metal wetting, cleaning and materials compatibility study
[AD-A113294] N82-28480

ELECTRON AVALANCHE
The electron avalanche ionization of air and a simple air chemistry model
[AD-A113501] N82-28864

ELECTRON BEAMS
Laser-generated electron emission from surfaces: Effect of the pulse shape on temperature and transient phenomena
[AD-A114282] N82-28633
Electron-beam sustained mercuric bromide laser study
[AD-A114246] N82-28634
The 2-D nonlinear theory of the free electron laser amplifier for an electron beam with finite axial and transverse dimensions
[AD-A114220] N82-28638
Electron beam transport in the ionosphere: Energy deposition and optical emissions based upon the combined effects of plasma turbulence and particle-particle interactions
[AD-A114376] N82-28868
The influence of a background plasma on the diocotron instability of a relativistic hollow electron beam
[AD-A113530] N82-29127
Stability of charged beam propagation through a relativistic hollow electron beam
[AD-A113529] N82-29128

ELECTRON DENSITY PROFILES
A literature survey on inverse scattering for electron density profile determination, volume 2
[AD-A113088] N82-28862

ELECTRON EMISSION
Rare earth boride electron emitter materials fabrication and evaluation
[AD-A113807] N82-29203

ELECTRON MICROSCOPY
Chemistry and morphology of coal liquefaction
[DE82-005141] N82-28392
Innovative measurement technology for the semiconductor device industry based on electron spectroscopy
[PB82-135922] N82-28615

ELECTRON PARAMAGNETIC RESONANCE
Sensitized photo-reduction of methyl viologen by metalloporphyrins
[AD-A114443] N82-28381
Endor studies of radiation-produced trapped electrons and radicals in disordered systems and radical matrix interactions in polymers and on surfaces
[AD-A114321] N82-28455

ELECTRON SCATTERING
Molecular reaction rates
[AD-A114342] N82-29130

ELECTRON SPIN
Sensitized photo-reduction of methyl viologen by metalloporphyrins
[AD-A114443] N82-28381

ELECTRON STATES
Photoneutron generation with electron undulators
[DE82-007034] N82-29142

ELECTRONIC EQUIPMENT
A compendium of lightning effects on future aircraft electronic systems
[AD-A114117] N82-28293
SD/LDEF technical User's Manual
[AD-A113504] N82-28324
Sourcebook on high-temperature electronics and instrumentation
[DE82-006197] N82-28567

ELECTRONIC EQUIPMENT TESTS
A true logarithmic IF frequency amplifier for radar applications
[RSRE-MEMO-3400] N82-28504
Digital sequential solid-state relay tester
[DE82-004680] N82-28610

ELECTRONIC MODULES
Computer-generated speech
[DE82-004672] N82-29063

ELECTRONIC PACKAGING
Hermetically sealable package for hybrid solid-state electronic devices and the like
[NASA-CASE-MSC-20181-1] N82-28549

ELECTRONS
Total electron content variations at mid-and high-latitudes
[AD-A113683] N82-28860

ELECTRONYSTAGMOGRAPHY
Nystagmometry of optovestibular interaction N82-28962

ELECTROPHYSIOLOGY
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Microelectronic electrode probe for testing brain electrical activity N82-28982

ELECTROPLATING
Galvanically precipitated aluminum: A new material --- for protective coating
[MBB-515-82-O] N82-28431

ELECTROSLAG REFINING
Anisotropic embrittlement in high-hardness ESR 4340 steel forgings
[AD-A113906] N82-28412

ELECTROSTATIC WAVES
Turbulent heating and filament structure of field-aligned current with anomaous resistivity
[REPT-680] N82-28855

ELEMENTARY PARTICLE INTERACTIONS
Tables and graphs of photon-interaction cross sections from 0.1 keV to 100 MeV derived from the LLL evaluated-nuclear-data library
[DE82-004819] N82-29139

ELEMENTARY PARTICLES
Electrodynamics: A consequence of nonlinear realizations of the Lorentz group
[DE82-004775] N82-28531

ELEVONS
Methodology for determining elevon deflections to trim and maneuver the DAST vehicle with negative static margin
[NASA-TM-84499] N82-28299

EMBRITTLEMENT
Anisotropic embrittlement in high-hardness ESR 4340 steel forgings
[AD-A113906] N82-28412

EMERGENCY LIFE SUSTAINING SYSTEMS
USSR report. Space biology and aerospace medicine, volume 16, no. 3, May - June 1982
[JPRS-81197] N82-28949
Metabolic distinctions related to intake of low-calorie 'survival' rations consisting only of readily assimilated carbohydrates N82-28953

EMISSION
Hydrogeochemical and stream sediment reconnaissance basic data for Aztec Qaudrangle, New Mexico
[DE82-000853] N82-28760
Radiation from high temperature plasmas
[AD-A113597] N82-29177

EMISSION SPECTRA
Charge transfer spectra and photoelectron emission by solutions
[AD-A114054] N82-29126
Reduction of spectral interferences in inductively coupled plasma-atomic emission spectrometry by selective spectral-line modulation
[AD-A112886] N82-29178
Spot spectroscopy: Local spectroscopic measurements within laser produced plasmas
[AD-A114165] N82-29180
Determination of the intrinsic Q(3)/5(1) line intensity ratio of molecular hydrogen
[ATR-82(8415)-1] N82-29247

EMITTERS
Rare earth boride electron emitter materials fabrication and evaluation
[AD-A113807] N82-29203

EMOTIONAL FACTORS
USSR report. Space biology and aerospace medicine, volume 16, no. 3, May - June 1982
[JPRS-81197] N82-28949
Role of hormonal compounds in regulation of electrolyte metabolism in the presence of emotional stress N82-28952
Slow waves of cardiac rhythm in healthy man under different conditions N82-28955

EMULSIONS
High gradient magnetic separation applied to liquid-liquid separation
[PB82-142811] N82-28495

ENCAPSULATING
Pelletization and roll encapsulation of phase-change materials
[DE82-000162] N82-28389
ENERGY CONSERVATION
Effect of outside combustion air on gas furnace efficiency
[AD-A113484] N82-28377
Analysis of data from the energy monitoring and control system at the Norris Cotton Federal Office Building
[PB82-138744] N82-28491
Summary of the Northstar home: An extension of the Solar 80 Program
[DE82-004688] N82-28817
ENERGY CONSUMPTION
Computerized, Instrumented, Residential Analysis (CIRA)
[DE82-004560] N82-28484
Analysis of data from the energy monitoring and control system at the Norris Cotton Federal Office Building
[PB82-138744] N82-28491
Impact of advanced power semiconductor systems on utilities and industry
[DE82-901286] N82-28547
Energy in Canada. Review and perspective
[DE81-700548] N82-28837
Standard weather data for New Zealand
[DE82-901427] N82-28912
ENERGY CONVERSION
Confinement and magnetoacoustic heating of a low density belt pinch plasma
[IPF-81-8] N82-29196
ENERGY CONVERSION EFFICIENCY
Intermediate photovoltaic system application experiment operational performance report. Volume 3: Mt. Laguna Radar Station, Mt. Laguna, California
[DE82-003006] N82-28809
ENERGY LEVELS
Experimental nuclear and radiochemistry
[DE82-002925] N82-28402
ENERGY POLICY
Oil shale project large retort run summary run L-3
[DE82-005109] N82-28764
Bureau of Mines research 1981: A summary of significant results in mineral technology and economics
[PB82-159971] N82-28776
Photovoltaics and electric utilities --- capital investment and revenue requirement
[DE82-006994] N82-28833
Energy in Canada. Review and perspective
[DE81-700548] N82-28837
Production of liquid fuels out of plant biomass and refuse: Methods, cost, potential
[IKE-K-68] N82-28838
Environmental data for sites in the National Solar Data Network, October 1981
[DE82-002706] N82-28850
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901280] N82-29106
Energy and solid/hazardous waste
[DE82-006964] N82-29152
ENERGY REQUIREMENTS
Residential-scale ice-storage system for space cooling
[DE82-000165] N82-28482
Energy in Canada. Review and perspective
[DE81-700548] N82-28837
Weighting factors in the DOE-2 computer program
[DE81-028593] N82-29057
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901280] N82-29106
ENERGY SPECTRA
Measurement of charge and energy spectra of heavy nuclei aboard Cosmos-936 artificial Earth satellite N82-28968
ENERGY STORAGE
Residential-scale ice-storage system for space cooling
[DE82-000165] N82-28482
Thermal energy storage in phase change material
[AD-A113355] N82-28793
Technical and economic assessment of fluidized-bed-augmented compressed-air energy-storage system. Volume 1: Executive summary
[DE82-001894] N82-28822
Conceptual design and engineering studies of adiabatic Compressed Air Energy Storage (CAES) with thermal energy storage
[DE82-005483] N82-28823
ENERGY TECHNOLOGY
Energy data base: Subject thesaurus permutated listing
[DE82-005770] N82-29229
ENERGY TRANSFER
Experimental nuclear and radiochemistry
[DE82-002925] N82-28402
Energy paths in chemical reactions
[AD-A114191] N82-28609
Studies in energetic material dynamics
[AD-A114226] N82-29129
ENGINE AIRFRAME INTEGRATION
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference --- wind tunnel tests
[NLR-MP-81020-U] N82-28262
ENGINE DESIGN
Automotive Stirling engine development program
[NASA-CR-167907] N82-29235
ENGINE NOISE
Static noise tests on modified augmentor wing jet STOL research aircraft
[NASA-TM-81231] N82-28295
ENGINE PARTS
Method of protecting a surface with a silicon-slurry/aluminide coating --- coatings for gas turbine engine blades and vanes
[NASA-CASE-LEW-13343-1] N82-28441
ENGINEERING MANAGEMENT
Realistic approach to the planning of high technology, high risk projects
[DE82-001049] N82-29223
ENTHALPY
A semi-analytical model for laser-induced ablation of fibre resin composites
[MRL-R-844] N82-28354
ENTOMOLOGY
Cultivation of insects as new branch of entomology - industrial entomology N82-28980
ENTROPY (STATISTICS)
Multivariate analysis and its applications
[AD-A113027] N82-29077
ENUMERATION
Apparatus and process for microbial detection and enumeration
[NASA-CASE-LAR-12709-1] N82-28604
ENVIRONMENT EFFECTS
Effect of applied stress, thermal environment and water in epoxy resins
[AD-A113016] N82-28450
Biota and biological principles of the aquatic environment
[CIRC-848-A] N82-28688
Oil shale and coal research FY 1980
[DE82-002825] N82-28751
Ecological implications of air pollutants from synthetic-fuels processing
[DE82-002792] N82-28844
Environmental and radiological safety studies. Interaction of Pu-23802 heat sources with terrestrial and aquatic environments
[DE82-004681] N82-28848
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE82-004936] N82-28871
US Geological Survey research in radioactive waste disposal, fiscal year 1979
[USGS-CIRC-847] N82-29145
Energy and solid/hazardous waste
[DE82-006964] N82-29152
ENVIRONMENT PROTECTION
Bureau of Mines research 1981: A summary of significant results in mineral technology and economics
[PB82-159971] N82-28776
ENVIRONMENT SIMULATORS
Preliminary Automated Orbit Determination System (AODS)/AODS environment simulator for prototype testing (ADEPT) user's guide
[NASA-TM-84798] N82-29036
ENVIRONMENTAL ENGINEERING
An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994
ENVIRONMENTAL LABORATORIES
Environmental chamber low temperature cutoff
[DE82-007626] N82-28316
ENVIRONMENTAL MONITORING
Environmental data for sites in the National Solar Data Network, October 1981
[DE82-002706] N82-28850
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Microorganisms used to monitor environmental pollution N82-28978
ENZYME ACTIVITY
Catecholamines and enzymes of their metabolism in rat myocardium after flight aboard the Cosmos-936 biosatellite N82-28966
ENZYMES
Monograph on new direction of chemistry and biology of peptide and protein bioregulators reviewed N82-28979
EPHEMERIDES
Spacecraft induced error sources N82-28718
EPITHELIUM
Mitotic activity and volume of epithelial cell nuclei of rat cornea following spaceflights in biosatellites N82-28965
EPOXY MATRIX COMPOSITES
Tensile and fatigue strength properties of Kevlar 29 aramid/epoxy unidirectional composites --- used in flywheels
[DE82-006777] N82-28362
EPOXY RESINS
Effect of applied stress, thermal environment and water in epoxy resins
[AD-A113016] N82-28450
EQUATIONS OF STATE
EOSMOD: A subroutine package for calculating equations of state and opacities
[DE82-004676] N82-29059
EROSION
Erosion mechanisms of metals
[AD-A111537] N82-28418
ERROR ANALYSIS
Report of the Subpanel on Error Characterization and Error Budgets N82-28706
Report of the subpanel on methods of verification N82-28707
Geometric error characterization and error budgets --- thematic mapper N82-28729
Misregistration's effects on classification and proportion estimation accuracy N82-28731
Time scales of systematic errors in a numerical weather forecast
[AD-A113374] N82-28888
Implementation of the Gibbs-Poole-Stockmeyer algorithm and the Gibbs-King algorithm
[AD-A113104] N82-29078
Error propagation in stiff differential systems of singular perturbation type
[TRITA-NA-8108] N82-29091
ERROR CORRECTING DEVICES
Development of a good-quality speech coder for transmission over noisy channels at 2.4 kb/s
[AD-A114068] N82-28510
ERROR DETECTION CODES
A simulation system for validating the analytical prediction of performance of the convolutional encoded and symbol interleaved TDRSS S-band return link service in a pulsed RFI environment
[NASA-CR-170428] N82-28500
ERRORS
A quantitative assessment of resampling errors N82-28728
Modeling misregistration and related effects on multispectral classification N82-28733
A case for inherent geometric and geodetic accuracy in remotely sensed VNIR and SWIR imaging products N82-28737
The last whole errata catalog
[AD-A112929] N82-29044
ERYTHROCYTES
Methodological aspects of testing erythrocyte balance by counting incubated reticulocytes N82-28972

Effects of low-intensity electromagnetic fields on human and animal erythrocytes N82-28974
ESTIMATES
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901280] N82-29106
ESTIMATING
Estimating the tops, bases, and amount of cloudiness from in situ sampling
[AD-A113107] N82-28904
The basket method for selecting balanced samples. Part 2: Applications to price estimation
[AD-A112949] N82-29096
Pre-configural polysampling pushback performance
[AD-A114304] N82-29099
Bias reduction
[AD-A114254] N82-29100
Khincin-Kullback-Leibler estimation with inequality constraints
[AD-A114326] N82-29101
ETCHING
Innovative measurement technology for the semiconductor device industry based on electron spectroscopy
[PB82-135922] N82-28615
ETHYL ALCOHOL
Ethanol production in Suffolk County, New York: Technical and economic feasibility
[PB82-145152] N82-28475
EUTROPHICATION
A Rand note: Policy analysis of water management for the Netherlands. Volume 3: Screening of eutrophication control tactics
[RAND/N-1500/3-NETH] N82-28691
EVALUATION
Evaluation of various navigation system concepts
[AD-A112919] N82-28275
Report of the subpanel on methods of verification N82-28707
EVAPORATION
Silver-doping effects and photostructural transformation in evaporated As2S3 thin films
[AD-A113148] N82-28375
Boundary subroutine for the NCAR global climate model
[PB82-158742] N82-28924
EVAPORATORS
OTEC biofouling, corrosion, and materials study from a moored platform at Punta Tuna, Puerto Rico
[DE82-007037] N82-28947
EXCITATION
Study of photoexcited states by positron method
[DE82-005469] N82-29143
EXERCISE PHYSIOLOGY
Physiological studies of heat stress acclimation during a specific exercise regimen
[AD-A111897] N82-28991
EXHAUST EMISSION
Terrestrial environment (climatic) criteria guidelines for use in aerospace vehicle development
[NASA-TM-82473] N82-28317
Strategies for steam handling and H2S abatement at geothermal power plants in the geysers area of Northern California
[DE82-001144] N82-28796
EXHAUST GASES
Emission characterization of an alcohol/diesel-pilot fueled compression ignition engine and its heavy-duty diesel counterpart
[PB82-154113] N82-28654
EXOBIOLOGY
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 232)
[NASA-SP-7011(232)] N82-28984
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 233, June 1982
[NASA-SP-7011(233)] N82-28985
EXPERIMENTAL DESIGN
Definition phase effort of the Spacelab-2 Infrared Telescope Experiment (IRT)
[NASA-CR-170424] N82-29243
EXPLORATION
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Orienting and exploratory behavior of gray rat in open field. Zoopsychological analysis N82-28981
EXPLOSIVES
Polycyclic high energy oxidizers
[AD-A112585] N82-28446
EXPOSURE
Long-term and progressive changes in Rhesus spectral sensitivity after low-level coherent light (514nm exposure) --- effects of laser exposure on visual function
[AD-A111639] N82-28946
An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994
What is ALARA
[DE81-030814] N82-28995
The consequences of hydrazine exposition and its treatment
[MBL-1981-2] N82-28996
EXTINCTION
Extinction by aerosol clouds of nonspherical particles at arbitrary wavelengths
[AD-A113535] N82-29163
EXTRACTION
A Rand note: Policy analysis of water management for the Netherlands. Volume 18: Sedimentation and dredging cost models
[RAND/N-1500/18-NETH] N82-28694
Requirements for the conceptual design of advanced underground coal extraction systems
[NASA-CR-169142] N82-28790
EXTRAGALACTIC RADIO SOURCES
Galactic radiation belts
[AD-A111836] N82-29244
EXTRAPOLATION
Acceleration of convergence of vector sequences
[NASA-TM-82931] N82-29075
EXTRATERRESTRIAL RADIATION
Design, fabrication, calibration, testing and satellite integration of a space radiation dosimeter
[AD-A113085] N82-28348
EXTRAVEHICULAR ACTIVITY
Spray applicator for spraying coatings and other fluids in space
[NASA-CASE-MSC-18852-1] N82-28640
EXTREMELY HIGH FREQUENCIES
Dielectric lens antenna for EHF airborne satellite communication terminals
[AD-A113250] N82-28515
EYE MOVEMENTS
A procedure for the analysis of nystagmus and other eye movements
[AD-A112603] N82-28987
EYE PROTECTION
Cold weather goggles. 2: Performance evaluation
[AD-A114067] N82-29008

F

F-111 AIRCRAFT
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267
FABRICATION
Tungsten alloy fabrication of penetrator materials
[AD-A114187] N82-28419
Photoelectric detection system --- manufacturing automation
[NASA-CASE-MFS-23776-1] N82-28545
Method of Fabricating Schottky Barrier solar cell
[NASA-CASE-NPO-13689-4] N82-28780
Rare earth boride electron emitter materials fabrication and evaluation
[AD-A113807] N82-29203
FACULAE
Evolutionary charts of solar activity (calcium plages) as functions of heliographic longitude and time
[UAG-81] N82-29255
FAIL-SAFE SYSTEMS
Reconfiguring redundancy management
[NASA-CASE-MSC-18498-1] N82-29013
FAILURE
Research study to define the critical failure mechanisms in notched composites under compression fatigue loading
[AD-A113654] N82-28356
A study of the breakdown mechanism of AISI 304 stainless steel, type 2024 aluminum and various titanium coatings
[AD-A113831] N82-28414
FAILURE ANALYSIS
An optimal design of simple symmetric laminates under the first ply failure criteria
[AD-A113689] N82-28357
Damage development mechanisms in notched graphite epoxy composite laminates during compressive fatigue loading
[PB82-142316] N82-28367
Reliability growth of continuous systems
[AD-A114099] N82-28658
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685
FAILURE MODES
Environmental chamber low temperature cutoff
[DE82-007626] N82-28316
FAIRINGS
Airborne laser turret flow control: A parametric study of wind tunnel model conditions
[AD-A113557] N82-28255
FALLOUT
Aerial radiological and photographic survey of eleven atolls and two islands within the Northern Marshall Islands. Dates of surveys, July-November 1978
[DE82-005584] N82-28752
FAN BLADES
National Transonic Facility (NTF) prototype fan blade fatigue test
[AD-A114405] N82-28261
FAR FIELDS
Two-dimensional hybrid modelling of soil-structure interaction
[PB82-142118] N82-28489
FAR INFRARED RADIATION
BRDF measurements of sunshield and baffle materials for the IRAS telescope
[NASA-TM-84235] N82-29155
FAST FOURIER TRANSFORMATIONS
A Fourier transform spectrometer for visible and near ultra-violet measurements of atmospheric absorption
[NASA-TM-73297] N82-28606
Fundamentals of number theory and polynominals algebra for numerical signal processing
[FUB-27-1981] N82-29087
FAST NEUTRONS
Charged particle simulation of fast neutron damage
[AD-A107394] N82-29124
FATIGUE (MATERIALS)
Research study to define the critical failure mechanisms in notched composites under compression fatigue loading
[AD-A113654] N82-28356
Damage development mechanisms in notched graphite epoxy composite laminates during compressive fatigue loading
[PB82-142316] N82-28367
On microstructural control of near threshold fatigue crack growth in 7000 series aluminum alloys
[AD-A113486] N82-28417
Crack velocities in natural rubber
[AD-A114298] N82-28677
FATIGUE LIFE
The influence of different types of anodic layers on the fatigue properties of 2024-T3 and 7075-T6 sheet material
[NLR-TR-80077-U] N82-28433
Fatigue design of machine elements N82-28660
FATIGUE TESTS
The influence of solution treatment time and quench rate on microstructure and mechanical properties of high magnesium aluminum magnesium alloys
[AD-A113826] N82-28413
Effect of defects in aluminum P/M
[AD-A113134] N82-28416
High fracture toughness bearing development
[AD-A113582] N82-28647
FAULT TOLERANCE
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
FEASIBILITY ANALYSIS
Use of metallic glasses in magnetic switching
[DE82-006736] N82-28456
Design handbook for photovoltaic power systems. Volume 1: Simplified methods for utility interconnected systems
[DE82-003108] N82-28810

FEDERAL BUDGETS
Probable impacts of budgets reductions on the development and use of photovoltaic energy systems
[EMD-82-60] N82-28781
NASA authorization for fiscal year 1983
[GPO-91-557] N82-29233
FEEDBACK CONTROL
Method and apparatus for transfer function simulator for testing complex systems
[NASA-CASE-NPO-15696-1] N82-28619
Discrete control of continuous processes
[AD-A113839] N82-29070
Feedback control of thermal runaway with compressi'on-decompression
[IPPJ-573] N82-29175
FERMIONS
Instantons in the quark plasma. The role of Fermion zero modes
[REPT-677] N82-29174
FERRITIC STAINLESS STEELS
In-bed corrosion tests of superheater alloys in a 10-square-foot AFBC
[DE82-901346] N82-28427
Investigation of the tensile deformation and fracture of dual-phase steel
[DE82-007522] N82-28682
FIBER COMPOSITES
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280
A semi-analytical model for laser-induced ablation of fibre resin composites
[MRL-R-844] N82-28354
FIBER OPTICS
Design and fabrication of multimode optical switches
[AD-A113812] N82-29159
Miniature interferometer transducer: An optical system description and cost analysis
[DE82-004653] N82-29168
Fine-grained hodoscopes based on scintillating optical fibers
[DE82-006248] N82-29170
An inexpensive 15 MHz fiber optic analog data link
[TRITA-PFU-82-05] N82-29172
Fiber optics technological review and assessment for traffic control
[PB82-145616] N82-29173
FIBER REINFORCED COMPOSITES
Properties of organic matrix short fiber composites
[AD-A113606] N82-28358
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364
FIBERS
Theoretical investigation of absorptive processes
[AD-A107278] N82-28507
FIELD EFFECT TRANSISTORS
Integrated balanced FETS for broadband millimeter wave amplifiers
[AD-A107526] N82-28551
FIELD THEORY (PHYSICS)
Electric and magnetic fields
[NASA-CR-165604] N82-28350
Nonrelativistic gauge theories
[DE81-700397] N82-29110
Schroedinger equation in the quantim field theory with nonlocal
[JINR-E2-80-705] N82-29214
FIGHTER AIRCRAFT
Advanced trending analysis/EDS data program
[AD-A113511] N82-28286
FILAMENT WINDING
Tensile and fatigue strength properties of Kevlar 29 aramid/epoxy unidirectional composites --- used in flywheels
[DE82-006777] N82-28362
FILE MAINTENANCE (COMPUTERS)
Systems Technology Laboratory (STL) compendium of utilities
[NASA-TM-84799] N82-29034
Software maintenance: Improvement through better development standards and documentation
[AD-A113257] N82-29047
Separability as a physical database design methodology
[AD-A114138] N82-29228
FILLETS
A finite element stress analysis of spur gears including fillet radii and rim thickness effects
[NASA-TM-82865] N82-28646
FINANCIAL MANAGEMENT
Concepts, the Journal of Defense Systems Acquisition Management, Autumn 1981, volume 4, number 4
[AD-A113130] N82-29220
FINE STRUCTURE
Fine scale structures in time and space of rainfall rate --- Sweden
[FOA-C-20448-E2] N82-28919
FINITE DIFFERENCE THEORY
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263
Finite-difference solution of the compressible stability eignevalue problem
[NASA-CR-3584] N82-28573
Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE82-004936] N82-28871
FINITE ELEMENT METHOD
Computer program description: An improved finite element program for three-dimensional electromagnetic problems
[PB82-134636] N82-28541
A finite element stress analysis of spur gears including fillet radii and rim thickness effects
[NASA-TM-82865] N82-28646
Improved finite element methodology for integrated thermal structural analysis
[NASA-CR-169126] N82-28666
Analysis of continuous beams with joint slip
[AD-A107112] N82-28669
Proceedings of the Conference on Finite Element Methods in South Africa N82-28671
Finite birth-and-death models in randomly changing environments
[AD-A114188] N82-29102
FIRE EXTINGUISHERS
Fire extinguishing tests -80 with methyl alcohol gasoline
[SP-RAPP-1981:20] N82-28485
FIRE FIGHTING
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268
FLAT PLATES
Quasi-square hole with optimum shape in an infinite plate subjected in in-plane loading. Optimization of inner and outer boundaries of beams and plates with holes
[AD-A114370] N82-28679
New look at long-term collector performance and utilizability
[DE82-005259] N82-28799
Design and validation of a thermal simulator for solar system performance testing
[DE82-005589] N82-28803
FLEXIBLE BODIES
The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476
Current topics in rotordynamics research N82-28477
FLEXIBLE SPACECRAFT
Controllability of inherently damped large flexible space structures
[NASA-CR-169127] N82-28345
FLEXING
Requirements for flexure testing of brittle materials
[AD-A113937] N82-28447
FLIGHT CONTROL
Electronic/electric technology benefits study --- avionics
[NASA-CR-165890] N82-28243
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291
Space Shuttle flying qualities and flight control system assessment study
[NASA-CR-170391] N82-28300
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302
FLIGHT CREWS
Development of a methodology for assessing aircrew workloads
[AD-A114364] N82-29010
Aircraft and crew scheduling during airlift operations
[AD-A114114] N82-29011
FLIGHT MECHANICS
Orbit determination software development for microprocessor based systems: Evaluation and recommendations
[NASA-TM-84794] N82-29028
FLIGHT PATHS
Summer MONEX US research flight missions, May - July 1979
[PB82-158718] N82-28923
FLIGHT SIMULATION
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302
Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309
FLIGHT SIMULATORS
Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306
Visual Technology Research Simulator (VTRS) human performance research: Phase 3
[AD-A112475] N82-28988
FLIGHT TESTS
Advanced trending analysis/EDS data program
[AD-A113511] N82-28286
Methodology for determining elevon deflections to trim and maneuver the DAST vehicle with negative static margin
[NASA-TM-84499] N82-28299
Study of boundary-layer transition using transonic cone Preston tube data
[NASA-CR-169130] N82-28579
FLIGHT TRAINING
Operational test and evaluation handbook for aircrew training devices. Volume 2: Operational effectiveness evaluation
[AD-A112570] N82-28305
Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306
Unconventional visual displays for flight training
[AD-A111392] N82-28999
FLOATING POINT ARITHMETIC
Impact of finite precision arithmetic on algorithm design, part 1
[AD-A113981] N82-29076
FLOOD CONTROL
A Rand note: Policy analysis of water management for the Netherlands. Volume 17: Flood safety model for the Ijssel Lakes --- dike safety
[RAND/N-1500/17-NETH] N82-28693
Powerhouse-gate: Concept definition study
[DE82-006226] N82-28834
FLOW CHARTS
Numerical simulations of magneto-hydrodynamic chemically reactive flows in three-dimensions on a vector computer
[AD-A113487] N82-29049
FLOW DISTRIBUTION
The attached flow over a slender delta wing with leading-edge flaps
[RAE-TR-81150] N82-28254
An investigation of the flow about an ogive cylinder at high angles of incidence
[AD-A113356] N82-28256
FLOW EQUATIONS
Computer program for calculating full potential transonic, quasi-three-dimensional flow through a rotating turbomachinery blade row
[NASA-TP-2030] N82-28247
FLOW GEOMETRY
Steady and unsteady transonic flow in a duct with a sudden enlargement
[MPIS-1/1982] N82-28599
FLOW MEASUREMENT
Measuring the flow properties of slotted test-section walls
[FFA-135] N82-28571

FLOW REGULATORS
Digital sequential solid-state relay tester
[DE82-004680] N82-28610
FLOW STABILITY
A general method to determine the stability of compressible flows
[NASA-CR-169129] N82-28572
A method for the circulation of invariant manifolds in hydrodynamic stability problems
[PB82-158825] N82-28603
Calculation of linear stability with the aid of asymptotic solutions of Orr-Sommerfeld equation. Part 1. The treatment of the linear stability problems for (alpha)R 1 containing one simple turning point; Two dimensional quasi-parallel flow: Jeffery-Hamel flow
[DE81-700130] N82-29086
FLOW VELOCITY
Laser anemometer using a Fabry-Perot interferometer for measuring mean velocity and turbulence intensity along the optical axis in turbomachinery
[NASA-TM-82841] N82-28605
FLUE GASES
Economics of spray-dryer FGD system: The two-stage open-loop processes
[DE82-900158] N82-28846
FLUID DYNAMICS
The 1981 summer study program in geophysical fluid dynamics at the Woods Hole Oceanographic Institution physics of convection
[AD-A114366] N82-28590
Experimental investigation of the circulation and the propagation of macroscopic ring vortices in He 2
[MPIS-16/1981] N82-28598
FLUID FILTERS
Impregnated filters for the determination of formaldehyde in indoor environments
[DE82-004025] N82-28852
FLUID MECHANICS
Measurement methods for fluid shear stress
[AD-A113020] N82-28582
FLUIDIZED BED PROCESSORS
In-bed corrosion tests of superheater alloys in a 10-square-foot AFBC
[DE82-901346] N82-28427
Optimization studies of various coal conversion systems
[DE82-005208] N82-28473
Technical and econmic assessment of fluidized-bed-augmented compressed-air energy-storage system. Volume 1: Executive summary
[DE82-001894] N82-28822
Fossil energy program
[DE82-005947] N82-28824
FLUORESCENCE
Surface enhanced spectroscopy
[AD-A114274] N82-28385
Electrodeless fluorescent lamp
[DE82-005147] N82-28564
Fluorescent glasses for use in fluorescently pumping Nd-3(+) doped laser glass
[AD-A107503] N82-28620
The removal of DF (v = 3 and 4) by H and D atoms
[AD-A114436] N82-28635
FLUORIDES
Inorganic halogen oxidizer research
[AD-A114196] N82 28382
FLUORO COMPOUNDS
Studies in chemical reactivity
[DE82-006891] N82-28407
FLUOROCARBONS
Technical options for reducing chlorofluorocarbon emissions
[RAND-R-2879-EPA] N82-28840
FLUOROPOLYMERS
Texturing polymer surfaces by transfer casting --- cardiovascular prosthesis
[NASA-CASE-LEW-13120-1] N82-28440
FLUTTER
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280
FLUX DENSITY
Injection space charge: Enlargements of flux density functioning point choice
[DE82-002299] N82-29131
FLY ASH
Evaluation of potential processes for recovery of metals from coal ash. Volume 2: Laboratory data and cost estimates
[DE82-005592] N82-28428
FLYING PLATFORMS
Attitude tracker N82-28736
FLYWHEELS
Tensile and fatigue strength properties of Kevlar 29 aramid/epoxy unidirectional composites --- used in flywheels
[DE82-006777] N82-28362
FOAMS
Fire extinguishing tests -80 with methyl alcohol gasoline
[SP-RAPP-1981:20] N82-28485
FOCUSING
A numerical method for using a ray tracing program to compute radio fields in regions of strong focusing
[AD-A113913] N82-28509
FOG
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Atlantic City, New Jersey. Parts A-F
[AD-A113180] N82-28894
East Coast fog: A case study
[AD-A113110] N82-28903
FOILS (MATERIALS)
Improvement of transverse strength in graphite-aluminum composites by high-strength surface foils
[AD-A114105] N82-28360
FOOD PROCESSING
Evaluation of engineering foods for closed Ecological Life Support System (CELSS)
[NASA-CR-167626] N82-29003
Evaluation of engineering foods for Controlled Ecological Life Support Systems (CELSS)
[NASA-CR-166359] N82-29006
FORCED VIBRATION
Limiting performance of nonlinear systems with applications to helicopter vibration control problems
[AD-A113239] N82-28301
FORECASTING
Users manual for polar ice forecast subsystem: Arctic
[AD-A114351] N82-28932
Program maintenance manual polar ice forecast subsystem: Arctic
[AD-A114343] N82-28933
FORGING
International aviation (selected articles)
[AD-A114422] N82-28245
Anisotropic embrittlement in high-hardness ESR 4340 steel forgings
[AD-A113906] N82-28412
FORMALDEHYDE
Impregnated filters for the determination of formaldehyde in indoor environments
[DE82-004025] N82-28852
FORMIC ACID
Electrocatalysis of the oxidations of some organic compounds on noble-metal electrodes by foreign-metal ad-atoms
[DE82-005619] N82-28406
FORTRAN
Atmospheric transmittance/radiance computer code FASCOD2
[AD-A113825] N82-28859
FORTRAN static source code analyzer (SAP) user's guide
[NASA-TM-84786] N82-29021
Structured FORTRAN preprocessor (SFORT) PDP-11/70 user's guide
[NASA-TM-84790] N82-29040
FORTRAN static source code analyzer program (SAP) user's guide, revision 1
[NASA-TM-84791] N82-29041
FORTRAN 4 program for calculating X-ray powder diffraction patterns version 9/10
[DE82-003893] N82-29062
FOULING
OTEC biofouling, corrosion, and materials study from a moored platform at Punta Tuna, Puerto Rico
[DE82-007037] N82-28947
FOUNDATIONS
Aseismic base isolation N82-28662
FOURIER ANALYSIS
Analog data compression for Versatile Experimental Kevlar Array (VEKA) telemetry
[AD-A114324] N82-28343
FOURIER TRANSFORMATION
Polynomial signals and polynomial transformations
[FUB-28-1981] N82-29066
Detection, estimation, and control on group manifolds
[AD-A113019] N82-29107
FRACTURE MECHANICS
Anisotropic embrittlement in high-hardness ESR 4340 steel forgings
[AD-A113906] N82-28412
High fracture toughness bearing development
[AD-A113582] N82-28647
The effect of stress triaxiality on the occurrence of ductile fracture in low strength steels
[DRIC-T-6493] N82-28663
Investigation of the tensile deformation and fracture of dual-phase steel
[DE82-007522] N82-28682
Gas-driven fracture propagation
[DE82-003079] N82-28870
Dimensions/NBS, volume 65, number 7, September 1981
[PB82-158692] N82-29230
FRACTURE STRENGTH
Fatigue design of machine elements N82-28660
FRACTURING
Multi-frac test series
[DE82-004514] N82-28680
FRAGMENTATION
Experimental nuclear and radiochemistry
[DE82-002925] N82-28402
FRAMES
Cryogenic performance of slotted brazed Rene 41 honeycomb panels
[NASA-CR-3525] N82-28664
FREE ELECTRON LASERS
Low voltage free electron laser optics
[AD-A113659] N82-28625
The 2-D nonlinear theory of the free electron laser amplifier for an electron beam with finite axial and transverse dimensions
[AD-A114220] N82-28638
FREEZING
Method of forming frozen spheres in a force-free drop tower
[NASA-CASE-NPO-14845-1] N82-28442
FREON
Heat pump operating with a mixture of fluids
[PB82-143611] N82-28602
FREQUENCY ASSIGNMENT
Audio conferencing using dynamic channel-assignment system
[AD-A114122] N82-28528
FREQUENCY CONVERTERS
Frequency compression of wideband signals using a distributed sampling technique
[AD-A113428] N82-28519
FREQUENCY DISTRIBUTION
Percentage frequency distributions of temperature and humidity for Australia (1963-77)
[AD-A113664] N82-28885
FREQUENCY RESPONSE
Frequency response measurements on Lyman-alpha humidiometers
[AD-A113240] N82-28905
FREQUENCY SHIFT
The frequency shift of a pulse by a time-independent, dispersive, lossy medium
[PB82-161977] N82-28542
FREQUENCY STANDARDS
A broadband waveguide transfer standard for the dissemination of UK national microwave power standards
[RSRE-MEMO-3390] N82-28498
FRIT
Ultra-lightweight mirror manufacturing and radiation response study
[AD-A106998] N82-29157
FUEL COMBUSTION
Effect of hydrocarbon fuel type on fuel
[NASA-TM-82916] N82-28460
FUEL CONSUMPTION
CF6 jet engine performance improvement: High pressure turbine active clearance control
[NASA-CR-165556] N82-28297

FUEL OILS
Fossil energy program
[DE82-005947] N82-28824
FUEL PRODUCTION
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
Alcohol Fuels Program Technical Review, summer, 1981
[DE82-006904] N82-28474
Oil shale and coal research FY 1980
[DE82-002825] N82-28751
Biomass energy conversion in Hawaii
[DE82-005139] N82-28801
Ecological implications of air pollutants from synthetic-fuels processing
[DE82-002792] N82-28844
Bicycle 2: A computer code for calculating levelized life-cycle costs
[DE82-001865] N82-29058
FUEL TESTS
Emission characterization of an alcohol/diesel-pilot fueled compression ignition engine and its heavy-duty diesel counterpart
[PB82-154113] N82-23654
FUNCTIONAL DESIGN SPECIFICATIONS
The design of cams for creep testing at constant stress
[NPL-DMA(B)-23] N82-28668
System description of the IMP-16C microprocessor orbit determination program
[NASA-TM-84802] N82-29023
Automated Orbit Determination System (AODS) requirements definition and analysis
[NASA-TM-84795] N82-29030
FUNCTIONALS
High-order terms in sensitivity analysis through a differential approach
[LA-8813-MS] N82-29072
FURNACES
Effect of outside combustion air on gas furnace efficiency
[AD-A113484] N82-28377
FUSION REACTORS
Feedback control of thermal runaway with compression-decompression
[IPPJ-573] N82-29175
Numerical study of the Columbia high-beta device: Torus-2
[DE82-007363] N82-29187

G

GADOLINIUM
Performance predictions for a room temperature, Ericsson cycle, magnetic heat pump
[AD-A114348] N82-28593
GALACTIC RADIATION
Galactic radiation belts
[AD-A111836] N82-29244
GALAXIES
Astronomical Society information number 55. Report of the meeting --- conference
[ISSN-0374-1958] N82-29241
GALLIUM ARSENIDES
Atmospheric effects on solar-cell calibration and evaluation
[DE82-007370] N82-28825
Preparation of large-diameter GaAs crystals
[AD-A107395] N82-29202
Development of a surface technology for GaAs devices
[AD-A112913] N82-29206
GAME THEORY
Decision algorithms for multiplayer games of incomplete information
[AD-A114334] N82-29053
GAMMA RAY ASTRONOMY
Activities report of the Institute for Extraterrestrial Physics
[MPI-PAE/EXTRATERR-172] N82-29245
GAMMA RAY SPECTROMETERS
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 1
[DE82-005544] N82-28744
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745
Airborne gamma-ray spectrometer and magnetometer survey, New Rockford quadrangle, North Dakota
[DE82-005535] N82-28746
GAMMA RAYS
Dimensions/NBS, volume 65, number 7, September 1981
[PB82-158692] N82-29230
GAPS
Quasi-square hole with optimum shape in an infinite plate subjected in in-plane loading. Optimization of inner and outer boundaries of beams and plates with holes
[AD-A114370] N82-28679
GARMENTS
Thermal garment
[NASA-CASE-XMS-03694-1] N82-29002
GAS ANALYSIS
Impregnated filters for the determination of formaldehyde in indoor environments
[DE82-004025] N82-28852
GAS BEARINGS
Materials research for advanced inertial instrumentation. Task 2: Gas bearing material development
[AD-A113518] N82-28649
GAS CHROMATOGRAPHY
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004179] N82-28388
Catalytic coal conversion support: Use of laser flash pyrolysis for structural analysis
[DE82-004176] N82-28391
Octanol/water partition coefficients and aqueous solubilities of organic compounds
[PB82-141797] N82-28408
GAS COMPOSITION
Domestic swine in physiological research. 3: Blood gas and acid-base values of arterial and venous blood from young anesthetized pigs maintained under steady-state ventilatory conditions
[AD-A111834] N82-28945
GAS DYNAMICS
Project Vulcan: The development of a gasdynamic heater. Volume 2: Heat transfer and performance analyses for a gasdynamic heater with helical impellers
[DE82-006788] N82-28595
GAS EXCHANGE
Human external respiration and gas exchange in acute period of adaptation to immersion in water
N82-28959
GAS FLOW
Attenuation of large amplitude pressure disturbances by liquid droplets
[AD-A114250] N82-28636
Gas-driven fracture propagation
[DE82-003079] N82-28870
GAS IONIZATION
The radial variation of the ionization in a coaxial plasma gun operated under critical velocity conditions
[TRITA-EPP-81-07] N82-29195
GAS LASERS
Airborne laser turret flow control: A parametric study of wind tunnel model conditions
[AD-A113557] N82-28255
Energy paths in chemical reactions
[AD-A114191] N82-28609
GAS RECOVERY
Multi-frac test series
[DE82-004514] N82-28680
GAS TURBINES
Monte Carlo calculations of two-dimensional combustor flows
[AD-A113780] N82-28374
Technical and econmic assessment of fluidized-bed-augmented compressed-air energy-storage system. Volume 1: Executive summary
[DE82-001894] N82-28822
GAS VALVES
Slow opening valve
[NASA-CASE-MSC-20112-1] N82-28641
GAS-SOLID INTERACTIONS
Gas-solid reactions. Part 1: External diffusion-controlled reactions
[AD-A114086] N82-28387
Analysis of Dense-Phase Fine-Coal Pneumatic Systems
[DE82-010243] N82-28759
GASEOUS DIFFUSION
Radon diffusion through multilayer earthen covers: Models and simulations
[DE82-001420] N82-29138
GASEOUS FUELS
Bicycle 2: A computer code for calculating levelized life-cycle costs
[DE82-001865] N82-29058
GASIFICATION
Economic summary of woody biomass direct combustion and gasification alternatives
[DE82-003140] N82-28916
GASOLINE
Fire extinguishing tests -80 with methyl alcohol gasoline
[SP-RAPP-1981:20] N82-28485
GATES (OPENINGS)
Powerhouse-gate: Concept definition study
[DE82-006226] N82-28834
GAUGE INVARIANCE
Nonrelativistic gauge theories
[DE81-700397] N82-29110
GAUGE THEORY
Nonrelativistic gauge theories
[DE81-700397] N82-29110
Instantons in the quark plasma. The role of Fermion zero modes
[REPT-677] N82-29174
GAUSS EQUATION
Experimental nuclear and radiochemistry
[DE82-002925] N82-28402
GEAR TEETH
The optimal design of involute gear teeth with unequal addenda
[NASA-TM-82866] N82-28645
GEARS
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
A finite element stress analysis of spur gears including fillet radii and rim thickness effects
[NASA-TM-82865] N82-28646
GELATION
Thermal analysis of SYNROC gel microspheres
[DE82-003472] N82-28399
GENERAL AVIATION AIRCRAFT
General aviation activity and avionics survey
[AD-A112924] N82-28244
Flight evaluation of LORAN-C in the State of Vermont
[NASA-TM-84711] N82-28278
GENETICS
Natural and social determination of human psyche
N82-28983
GEOCHEMISTRY
Hydrogeochemical and stream sediment reconnaissance basic data for Sheridan quadrangle, Wyoming
[DE82-002467] N82-28748
Hydrogeochemical and stream sediment reconnaissance basic data for Tularosa quadrangle, New Mexico
[DE82-000787] N82-28756
Hydrogeochemical and stream sediment reconnaissance basic data for Aztec Qaudrangle, New Mexico
[DE82-000853] N82-28760
Hydrogeochemical and stream sediment reconnaissance basic data for Silver City quadrangle, New Mexico; Arizona
[DE82-000852] N82-28761
Hydrogeochemical and stream sediment reconnaissance basic data for Dallas NTMS quadrangle, Texas
[DE82-000856] N82-28763

Geochemical and geophysical models of the fossile-fuel CO2 climate problem
[DE82-005484] N82-28917

GEODESY

Geodetic control N82-28720

Least squares adjustment of large-scale geodetic networks by orthogonal decomposition
[DE82-002253] N82-28758

GEODETIC COORDINATES

Precise determination of the disturbing potential using alternative boundary values
[PB82-150392] N82-28875

GEODYNAMICS

Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking
[NASA-TM-73298] N82-28690

GEOELECTRICITY

Interpretation of time-domain electromagnetic soundings in the Calico Hills area, Nevada Test Site, Nye County, Nevada
[DE82-004260] N82-28869

GEOGRAPHIC APPLICATIONS PROGRAM

Needs for registration and rectification of satellite imagery for land use and land cover and hydrologic applications N82-28709

GEOGRAPHY

Wind resource analysis for the Tennessee Valley authority region, volume 1
[DE82-004927] N82-28913

GEOIDS

On astro-gravimetric calculation of the quasigeoids for the Federal Republic of Germany
[SER-A-92] N82-28872

GEOLOGICAL SURVEYS

Registration and rectification needs of geology N82-28710

Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 1
[DE82-005544] N82-28744

Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745

Airborne gamma-ray spectrometer and magnetometer survey, New Rockford quadrangle, North Dakota
[DE82-005535] N82-28746

Hydrogeochemical and stream sediment reconnaissance basic data for Tularosa quadrangle, New Mexico
[DE82-000787] N82-28756

Airborne gamma-ray spectrometer and magnetometer survey, Roseburg Quadrangle, Oregon, volume 1
[DE82-005536] N82-28765

US Geological Survey research in radioactive waste disposal, fiscal year 1979
[USGS-CIRC-847] N82-29145

GEOLOGY

Nevada nuclear waste storage investigations
[DE82-005879] N82-29149

GEOMAGNETISM

Power spectra of geomagnetic fluctuations between 0.02 and 20 Hz
[AD-A113848] N82-28861

Synchronization of cardiovascular accidents with physical clocks N82-28956

GEOMETRIC RECTIFICATION (IMAGERY)

Proceedings of the NASA Workshop on Registration and Rectification
[NASA-CR-169133] N82-28699

Workshop rationale N82-28700

Report on the subpanel on remapping procedures N82-28704

USDA registration and rectification requirements N82-28708

Needs for registration and rectification of satellite imagery for land use and land cover and hydrologic applications N82-28709

Data registration and integration requirements for severe storms research N82-28711

Spaceborne scanner imaging system errors N82-28713

Scanner imaging systems, aircraft N82-28715

Geometric and rediametric distortion in spaceborne SAR imagery N82-28717

Inter-image matching N82-28725

Computational aspects of remapping digital imagery N82-28727

Geometric error characterization and error budgets --- thematic mapper N82-28729

Geometric verification N82-28730

Attitude tracker N82-28736

A case for inherent geometric and geodetic accuracy in remotely sensed VNIR and SWIR imaging products N82-28737

A concept for a future ground control data set for image correction N82-28738

Current status of metric reduction of (passive) scanner data N82-28739

GEOPHYSICAL FLUIDS

The 1981 summer study program in geophysical fluid dynamics at the Woods Hole Oceanographic Institution physics of convection
[AD-A114366] N82-28590

GEOPHYSICS

The 1981 summer study program in geophysical fluid dynamics at the Woods Hole Oceanographic Institution physics of convection
[AD-A114366] N82-28590

Geochemical and geophysical models of the fossile-fuel CO2 climate problem
[DE82-005484] N82-28917

GEOSTROPHIC WIND

Vertical sections of temperature, salinity, thermosteric anomaly and zonal geostrophic velocity from NORPAX shuttle experiment, part 1
[PB82-163106] N82-28944

GEOSYNCHRONOUS ORBITS

Intel 8080 orbit propagation program system description and user's guide
[NASA-TM-84783] N82-29025

GEOTECHNICAL ENGINEERING

Geotechnical computer program survey
[AD-A114106] N82-28481

GEOTHERMAL ENERGY CONVERSION

Strategies for steam handling and H2S abatement at geothermal power plants in the geysers area of Northern California
[DE82-001144] N82-28796

GEOTHERMAL ENERGY UTILIZATION

Preliminary conceptual design for geothermal space heating conversion of school district 50 joint facilities at Pagosa Springs, Colorado. GTA report no. 6
[DE82-005245] N82-28800

Upstream H2S removal from geothermal steam
[DE82-901293] N82-28847

GEOTHERMAL RESOURCES

Zeta potential study of the water treatment of geothermal brines
[DE82-005910] N82-28849

GEOTHERMAL TECHNOLOGY

Sourcebook on high-temperature electronics and instrumentation
[DE82-006197] N82-28567

GERMANIUM

Search for superconductivity in ion-implanted b-Ge films
[IPNO-PHN-80-22] N82-29211

GIBBS FREE ENERGY

Simplified free-energy calculation for ion-induced heteromolecular nucleation
[NASA-TP-2039] N82-28839

GLASS

Method of forming frozen spheres in a force-free drop tower
[NASA-CASE-NPO-14845-1] N82-28442

State of the art and development of nonmetallic materials: Glass, ceramic, graphite
[MBB-509-O] N82-28457

Thermo-optical properties of optical glasses
[DE82-003681] N82-29169

GLASS FIBER REINFORCED PLASTICS

Development of materials and manufacturing technology over the next 20 years: Composite materials
[MBB-UD-341-82-O] N82-28365

GLASS FIBERS

Properties of organic matrix short fiber composites
[AD-A113606] N82-28358

Preliminary study of the possibilities for the use of glass fibers in hydrophones
[TPD-1981-0-2(105.106)] N82-29115

GLASS LASERS

Fluorescent glasses for use in fluorescently pumping Nd-3(+) doped laser glass
[AD-A107503] N82-28620

The development of a high average power glass laser source
[AD-A107527] N82-28621

GLIDE PATHS

Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
[NASA-CR-3574-PT-4] N82-28269

GLOBAL POSITIONING SYSTEM

Evaluation of various navigation system concepts
[AD-A112919] N82-28275

System architecture study of an orbital GPS user terminal
[NASA-CR-166821] N82-28501

Navstar/Global Positioning System N82-28719

Precise determination of the disturbing potential using alternative boundary values
[PB82-150392] N82-28875

GPSPAC/LANDSAT-D Interface (GLI) system description
[NASA-TM-84803] N82-29037

GPSPAC/LANDSAT-D Interface (GLI) system user's guide
[NASA-TM-84784] N82-29038

System description for the Global Positioning Subsystem Experiment Package (GPSPAC) Experiment Data Preprocessor (GEDAP)
[NASA-TM-84785] N82-29039

GLUCOSE

Testosterone enhances C-14 2-deoxyglucose uptake by striated muscle --- sex hormones and muscle
[NASA-CR-169101] N82-28986

GLUCOSIDES

Condition of rats connective tissue during long-term hypokinesia and in recovery period N82-28969

GOGGLES

Cold weather goggles. 2: Performance evaluation
[AD-A114067] N82-29008

GOLD

Electrocatalysis of the oxidations of some organic compounds on noble-metal electrodes by foreign-metal ad-atoms
[DE82-005619] N82-28406

GRADIENTS

High gradient magnetic separation applied to liquid-liquid separation
[PB82-142811] N82-28495

GRAIN BOUNDARIES

A first report on welding diagrams
[PB82-134602] N82-28653

Controlled grain boundary structures in superconductors
[AD-A114243] N82-29208

GRAPHITE

State of the art and development of nonmetallic materials: Glass, ceramic, graphite
[MBB-509-O] N82-28457

GRAPHITE-EPOXY COMPOSITES

An optimal design of simple symmetric laminates under the first ply failure criteria
[AD-A113689] N82-28357

Damage development mechanisms in notched graphite epoxy composite laminates during compressive fatigue loading
[PB82-142316] N82-28367

Buckling test of a 3-meter-diameter corrugated graphite-epoxy ring-stiffened cylinder
[NASA-TP-2032] N82-28665

GRAPHS (CHARTS)

Intermediate photovoltaic system application experiment operational performance report. Volume 4: Mt. Laguna Radar Station, Mt. Laguna, Calif.
[DE82-007565] N82-28835

Intermediate photovoltaic system application experiment operational performance report. Volume 5: Newman Power Station Site, El Paso, Tex.
[DE82-007566] N82-28836

Wind energy resource atlas. Volume 2: TVA power service area
[DE82-004877] N82-28914

Wind resource analysis for the Tennessee Valley authority region, volume 3
[DE82-006196] N82-28915

Wind resource analysis for the Tennessee Valley authority region, volume 4
[DE82-005103] N82-28916

GRAVIMETRY
On astro-gravimetric calculation of the quasigeoids for the Federal Republic of Germany
[SER-A-92] N82-28872

GRAVITATIONAL EFFECTS
Endurance of +Gz G forces by middle-aged people before and after 7-day immersion N82-28958

GRAVITATIONAL FIELDS
Inertial surveying technology
[AD-A107379] N82-28863

GRAVSAT SATELLITE
Precise determination of the disturbing potential using alternative boundary values
[PB82-150392] N82-28875

GREAT PLAINS CORRIDOR (NORTH AMERICA)
Regional assessment of aquifers for thermal energy storage. Volume 1: Regions 1 through 6
[DE82-002507] N82-28827
Regional assessment of aquifers for thermal-energy storage. Volume 2: Regions 7 through 12
[DE82-002506] N82-28828

GREEN FUNCTION
High-order terms in sensitivity analysis through a differential approach
[LA-8813-MS] N82-29072

GREEN WAVE EFFECT
Reports from the German Meteorological Service. Number 158: Contribution to phenology of Europe 4 long term phenological observation series for western, central, and eastern Europe
[ISSN-0072-4130] N82-28876

GROUND BASED CONTROL
Autonomous scheduling technology for Earth orbital missions
[NASA-CR-168939] N82-29217

GROUND STATIONS
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report
[NASA-CR-169136] N82-28330
LMSS communication network design N82-28332
The ground segment N82-28334

GROUND SUPPORT SYSTEMS
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) MODCOMP device and MAX 4 dependency study
[NASA-TM-84796] N82-29027
GPSPAC/LANDSAT-D Interface (GLI) system description
[NASA-TM-84803] N82-29037
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) state-of-the-art computer systems/ compatibility study
[NASA-TM-84792] N82-29042

GROUND TRUTH
The use of terrain height information for improving the accuracy of classification of LANDSAT data
[RAE-TM-SPACE-297] N82-28696

GROUND WATER
Hydrogeochemical and stream sediment reconnaissance basic data for Aztec Qaudrangle, New Mexico
[DE82-000853] N82-28760
Hydrogeochemical and stream sediment reconnaissance basic data for Dallas NTMS quadrangle, Texas
[DE82-000856] N82-28763
Verification of the potential yield and chemical quality of the allow dolomite aquifer in DuPage County, Illinois
[PB82-158361] N82-28779
Boundary subroutine for the NCAR global climate model
[PB82-158742] N82-28924

GROUND WAVE PROPAGATION
OTT: A computer aided ground wave model for the VHF range in hilly terrain with varying ground characteristics
[FOA-C-30265-E2] N82-29088

GROUND WIND
Measurements of whitecap coverage and surface winds over the Gulf of Mexico loop current
[AD-A114429] N82-28937

GROUP THEORY
Detection, estimation, and control on group manifolds
[AD-A113019] N82-29107

GULF OF MEXICO
Surface stress estimation for study of the circulation dynamics of the Gulf of Mexico
[AD-A114349] N82-28936
Measurements of whitecap coverage and surface winds over the Gulf of Mexico loop current
[AD-A114429] N82-28937

GUMS (SUBSTANCES)
Basic study of fuel storage stability
[AD-A114127] N82-28466

GUN LAUNCHERS
Laboratory demonstration electromagnetic launcher: Preliminary hazard analysis
[AD-A114154] N82-28524

GUNS (ORDNANCE)
Kinematic investigation Hughes Helicopter 7.62mm chain gun
[AD-A113114] N82-28287

GUST LOADS
Gust response of commerical jet aircraft including effects of autopilot operation
[NASA-CR-165919] N82-28266
The determination of gust loads on nonlinear aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28303
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685
A bivariate gamma probability distribution with application to gust modeling --- for the ascent flight of the space shuttle
[NASA-TM-82483] N82-29094

GUSTS
A bivariate gamma probability distribution with application to gust modeling --- for the ascent flight of the space shuttle
[NASA-TM-82483] N82-29094

GYROSCOPES
Materials research for advanced inertial instrumentation. Task 1: Dimensional stability of gyroscope structural materials
[AD-A113497] N82-28273

H

HABITABILITY
Preparing and communicating habitability design information
[AD-A113379] N82-28518

HAIL
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Atlantic City, New Jersey. Parts A-F
[AD-A113180] N82-28894
Case studies on convective storms, case study 10, 22 July 1975: Mature storm study: A conceptual model synthesized from microphysical and dynamic observations of a multicell thunderstorm
[PB82-159567] N82-28928

HALL EFFECT
Drift resistive interchange and tearing modes in cylindrical geometry
[AD-A113499] N82-29179

HALLEY'S COMET
Distribution of the magnetic field in Halley's comet tail obtained from the plasma cloud kinetics
[REPT-673] N82-29250

HALOGEN COMPOUNDS
Inorganic halogen oxidizer research
[AD-A114196] N82-28382

HALOS
Neutral interstellar gas in the lower galactic halo N82-29246

HARDENING (SYSTEMS)
Evaluation of applicability of standard CW EMI/RFI shielding effectiveness test techniques to assessment of EMP hardness of tactical shelters
[AD-A113042] N82-28517

HARDNESS
Anisotropic embrittlement in high-hardness ESR 4340 steel forgings
[AD-A113906] N82-28412

HARMONIC ANALYSIS
Nonlinear system identification technique validation
[AD-A112593] N82-28505

HARNESSES
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552

HARPOON MISSILE
Flight termination system equipment. Volume 1: Antennas and antenna couplers
[AD-A113493] N82-28320

HAWAII
Regional assessment of aquifers for thermal-energy storage. Volume 2: Regions 7 through 12
[DE82-002506] N82-28828
Analysis of the atmospheric aerosol size distribution information retrievable from near-limb angular radiance measurements taken on Mauna Loa, Hawaii
[DE82-005999] N82-28851

HAZARDS
Requirements and alternatives for a management information system to support hazardous waste enforcement
[PB82-154410] N82-29231

HEAD-UP DISPLAYS
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292

HEALTH
An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994

HEARING
Effect of caloric stimulation of vestibular system on hearing N82-28963

HEART DISEASES
Synchronization of cardiovascular accidents with physical clocks N82-28956

HEART RATE
Slow waves of cardiac rhythm in healthy man under different conditions N82-28955

HEAT ACCLIMATIZATION
Physiological studies of heat stress acclimation during a specific exercise regimen
[AD-A111897] N82-28991
Acclimatization to dry heat: Active men versus active women
[AD-A111708] N82-28993

HEAT EXCHANGERS
An experimental and numerical study of an air-to-air heat exchanger using liquid reservoir variable conductance heat pipes
[AD-A113354] N82-28585
Thermal energy storage in phase change material
[AD-A113355] N82-28793
Dynamic analysis and simulation of a large scale thermal simulator
[DE82-005588] N82-28802
Upstream H2S removal from geothermal steam
[DE82-901293] N82-28847
OTEC biofouling, corrosion, and materials study from a moored platform at Punta Tuna, Puerto Rico
[DE82-007037] N82-28947

HEAT FLUX
Optical and in situ measuring of structure parameters relevant to temperature and humidity and their application to the measuring of sensible and latent heat flux --- atmospheric optics
[AD-A114336] N82-28637
Geology related to acoustic transmission: Eastern Caribbean
[AD-A114430] N82-28938
Inverse of a Laplace transform and its numerical evaluation
[DE82-004667] N82-29085

HEAT GENERATION
Bicycle 2: A computer code for calculating levelized life-cycle costs
[DE82-001865] N82-29058

HEAT PIPES
Testing of a high capacity research heat pipe
[NASA-CR-167625] N82-28578
An experimental and numerical study of an air-to-air heat exchanger using liquid reservoir variable conductance heat pipes
[AD-A113354] N82-28585
Investigation of the long term behavior of heat pipes
[IKE-5-215] N82-28597

Evaluation of nonelectrical energy-transmission options
[DE82-000886] N82-28821
HEAT PUMPS
Performance predictions for a room temperature, Ericsson cycle, magnetic heat pump
[AD-A114348] N82-28593
Heat pump operating with a mixture of fluids
[PB82-143611] N82-28602
Thermal and economic analysis of solar-assisted heat pumps for low-temperature IPH applications
[DE82-006185] N82-28805
HEAT RESISTANT ALLOYS
Process for recovering chromium and other metals from superalloy scrap
[PB82-145418] N82-28436
Consolidation of an iron-base superalloy by powder metallurgy techniques
[PB82-135906] N82-28493
Comparison of laser welds in two stainless steels
[DE82-004699] N82-28651
Non-destructive evaluation of defects in structural materials using long-wavelength neutrons
[AD-A113500] N82-28656
HEAT SHIELDING
Low cost 2-D heatshield materials --- braided tapes
[AD-A113928] N82-28355
HEAT SOURCES
Environmental and radiological safety studies. Interaction of Pu-23802 heat sources with terrestrial and aquatic environments
[DE82-004681] N82-28848
HEAT STORAGE
Pelletization and roll encapsulation of phase-change materials
[DE82-000162] N82-28389
Survey of commercial thermal-storage installations in the United States and Canada
[DE82-000131] N82-28797
Solar project description for Saddle Hill Trust: Lot 77, single family residence, Medway, Massachusetts
[DE82-003326] N82-28807
Development of a RELAP model for the Barstow thermal-storage subsystem
[DE82-006828] N82-28819
Regional assessment of aquifers for thermal energy storage. Volume 1: Regions 1 through 6
[DE82-002507] N82-28827
Regional assessment of aquifers for thermal-energy storage. Volume 2: Regions 7 through 12
[DE82-002506] N82-28828
Regional assessment of aquifers for thermal-energy storage. Volume 3: Appendices
[DE82-002505] N82-28829
HEAT TOLERANCE
Acclimatization to dry heat: Active men versus active women
[AD-A111708] N82-28993
HEAT TRANSFER
Comparison of laser anemometer measurements and theory in an annular turbine cascade with experimental accuracy determined by parameter estimation
[NASA-TM-82860] N82-28250
Thermochemical generation of hydrogen
[NASA-CASE-NPO-15015-1] N82-28368
The dryout region in frictionally heated sliding contacts
[NASA-TM-82796] N82-28574
Project Vulcan: The development of a gasdynamic heater. Volume 2: Heat transfer and performance analyses for a gasdynamic heater with helical impellers
[DE82-006788] N82-28595
Thermal energy storage in phase change material
[AD-A113355] N82-28793
Heat removal from the simulation electrode of a high power log pulse ion source
[DE81-700008] N82-29192
HEAT TRANSFER COEFFICIENTS
Experimental heat transfer coefficients for the cooling of oil in horizontal internal forced convective transitional flow
[PB82-142993] N82-28601
HEAT TREATMENT
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004179] N82-28388
The influence of solution treatment time and quench rate on microstructure and mechanical properties of high magnesium aluminum magnesium alloys
[AD-A113826] N82-28413
High fracture toughness bearing development
[AD-A113582] N82-28647
HEATING EQUIPMENT
Performance assessment of materials and components of the Westinghouse coal gasification process development unit
[DE82-005995] N82-28401
NBS/ESDS: A computer model for the simulation of hot water systems
[PB82-139361] N82-28492
Project Vulcan: The development of a gasdynamic heater. Volume 2: Heat transfer and performance analyses for a gasdynamic heater with helical impellers
[DE82-006788] N82-28595
Preliminary conceptual design for geothermal space heating conversion of school district 50 joint facilities at Pagosa Springs, Colorado. GTA report no. 6
[DE82-005245] N82-28800
HEAVY IONS
Meson production in relativistic-heavy-ion collisions
[DE82-005652] N82-29141
Inertial fusion program
[DE82-007361] N82-29189
HEAVY NUCLEI
Measurement of charge and energy spectra of heavy nuclei aboard Cosmos-936 artificial Earth satellite N82-28968
HEIGHT
The use of terrain height information for improving the accuracy of classification of LANDSAT data
[RAE-TM-SPACE-297] N82-28696
Ocean altimetry algorithms status: March 1982
[AD-A114325] N82-28935
HELICOPTERS
Improved 243 MHz homing antenna system for use on helicopters
[NLR-MP-81022-U] N82-28276
Evaluations of helicopter instrument-flight handling qualities
[AD-A114004] N82-28285
Kinematic investigation Hughes Helicopter 7.62mm chain gun
[AD-A113114] N82-28287
HISS calibration, ice phobics and FAA R/D evaluations
[AD-A114435] N82-28289
Limiting performance of nonlinear systems with applications to helicopter vibration control problems
[AD-A113239] N82-28301
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
Vibration and assessment of this flight factor by pilots N82-28976
HELIOSPHERE
Pioneer 10/11 data analysis of the trapped radiation experiment
[NASA-CR-166360] N82-28312
HELIOSTATS
Plant design and economic analysis for solar coal gasification
[DE82-003178] N82-28468
HELIUM ISOTOPES
Experimental investigation of the circulation and the propagation of macroscopic ring vortices in He 2
[MPIS-16/1981] N82-28598
HELIUM PLASMA
Numerical study of the Columbia high-beta device: Torus-2
[DE82-007363] N82-29187
HEMATOCRIT RATIO
Methodological aspects of testing erythrocyte balance by counting incubated reticulocytes N82-28972
Effects of low-intensity electromagnetic fields on human and animal erythrocytes N82-28974
HEMISPHERICAL SHELLS
Experimental time-domain determination of complex resonances of simple objects --- radar scattering and target recognition
[AD-A113168] N82-28521
HEMODYNAMICS
Regulation of cerebral circulation in erect position N82-28957
Reaction to diminished circulating blood volume in individuals who are susceptible and insusceptible to motion sickness (seasickness) N82-28960
HEMOLYSIS
Effects of low-intensity electromagnetic fields on human and animal erythrocytes N82-28974
HERMETIC SEALS
Hermetically sealable package for hybrid solid-state electronic devices and the like
[NASA-CASE-MSC-20181-1] N82-28549
HEURISTIC METHODS
Implementation of the Gibbs-Poole-Stockmeyer algorithm and the Gibbs-King algorithm
[AD-A113104] N82-29078
HEXOSES
Condition of rats connective tissue during long-term hypokinesia and in recovery period N82-28969
HIGH ASPECT RATIO
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279
HIGH ENERGY ELECTRONS
High energy density battery lithium thionyl chloride improved reverse voltage design
[AD-A113498] N82-28794
HIGH FREQUENCIES
An inexpensive 15 MHz fiber optic analog data link
[TRITA-PFU-82-05] N82-29172
HIGH POWER LASERS
Airborne laser turret flow control: A parametric study of wind tunnel model conditions
[AD-A113557] N82-28255
High power metallic halide laser --- amplifying a copper chloride laser
[NASA-CASE-NPO-14782-1] N82-28616
HIGH PRESSURE
Possible impairment of respiratory regulation under hyperbaric nitrogen narcosis N82-28964
HIGH RESOLUTION
High resolution spectral absorption in the short wavelength wing of the 2.7-micrometer water band at 1,000 K
[AD-A114156] N82-28383
Study of hydrogen in coals, polymers, oxides, and muscle water by nuclear magnetic resonance: Extension of solid state high resolution techniques
[DE82-005454] N82-28395
HIGH STRENGTH
Improvement of transverse strength in graphite-aluminum composites by high-strength surface foils
[AD-A114105] N82-28360
HIGH STRENGTH ALLOYS
Investigation of corrosion and microstructural properties of high strength aluminum alloys after Jominy testing
[NLR-MP-81004-U] N82-28432
The Jominy end-quench test for investigation of corrosion properties and microstructure of high strength aluminum alloys
[NLR-TR-80102-U] N82-28434
Stress corrosion crack initiation testing of high strength aluminum alloys using tuning fork type specimens
[NLR-TR-81053-U] N82-28686
HIGH TEMPERATURE ENVIRONMENTS
High temperature damping of dynamic systems N82-28661
HIGH TEMPERATURE PLASMAS
Radiation from high temperature plasmas
[AD-A113597] N82-29177
HIGH TEMPERATURE RESEARCH
The high temperature thermochemical properties of carbon
[NASA-TM-84710] N82-28380
Sourcebook on high-temperature electronics and instrumentation
[DE82-006197] N82-28567
HIGHWAYS
Traffic capacity through work zones on urban freeways
[PB82-143009] N82-29239
Sight distance requirements at lane closure work zones on urban freeways
[PB82-142290] N82-29240
HISTORIES
The development and application of the magnetron
[AD-A114155] N82-28560

HODOSCOPES
Fine-grained hodoscopes based on scintillating optical fibers
[DE82-006248] N82-29170
HOLOGRAPHY
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292
HOMEOSTASIS
Effect of high ambient temperature on carbohydrate metabolism in rat liver and skeletal muscles N82-28975
HOMING DEVICES
Improved 243 MHz homing antenna system for use on helicopters
[NLR-MP-81022-U] N82-28276
HONEYCOMB STRUCTURES
Cryogenic performance of slotted brazed Rene 41 honeycomb panels
[NASA-CR-3525] N82-28664
HORIZON SCANNERS
Autonomous onboard attitude determination system specifications and requirements
[NASA-TM-84800] N82-29056
HORIZONTAL FLIGHT
Some comments on the prediction of forward flight effects on jet noise
[MPIS-20/1981] N82-29118
HORMONES
Monograph on new direction of chemistry and biology of peptide and protein bioregulators reviewed N82-28979
Testosterone enhances C-14 2-deoxyglucose uptake by striated muscle --- sex hormones and muscle
[NASA-CR-169101] N82-28986
HOT CORROSION
In-bed corrosion tests of superheater alloys in a 10-square-foot AFBC
[DE82-901346] N82-28427
HOVERCRAFT GROUND EFFECT MACHINES
Fifteen years experience with composite propeller blades --- for hovercraft N82-28363
HUMAN BEHAVIOR
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260
HUMAN BEINGS
Natural and social determination of human psyche N82-28983
HUMAN FACTORS ENGINEERING
Vibration and assessment of this flight factor by pilots N82-28976
Thermal garment
[NASA-CASE-XMS-03694-1] N82-29002
Cold weather goggles. 2: Performance evaluation
[AD-A114067] N82-29008
Flight crewmember workload evaluation
[AD-A114167] N82-29012
HUMAN PERFORMANCE
Adapative motivation theory
[AD-A111195] N82-28997
On models and methods for performance measurement
[AD-A113578] N82-28998
Task analysis and the ability requirements of tasks: Collected papers
[AD-A111181] N82-29000
The ranking of displays based on transinformation --- as a measure of tracking performance
[FB-52] N82-29001
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260
HUMAN REACTIONS
Human external respiration and gas exchange in acute period of adaptation to immersion in water N82-28959
Reaction to diminished circulating blood volume in individuals who are susceptible and insusceptible to motion sickness (seasickness) N82-28960
HUMIDITY
Environmental data for sites in the National Solar Data Network, October 1981
[DE82-002706] N82-28850
Percentage frequency distributions of temperature and humidity for Australia (1963-77)
[AD-A113664] N82-28885
Bulletin of hydrological and meteorological Service, selected articles
[AD-A114382] N82-28910
HUMIDITY MEASUREMENT
Critical assessment of a series of lidar aerosol measurement results
[DFVLR-FB-82-03] N82-28853
Frequency response measurements on Lyman-alpha humidiometers
[AD-A113240] N82-28905
HYBRID CIRCUITS
Hermetically sealable package for hybrid solid-state electronic devices and the like
[NASA-CASE-MSC-20181-1] N82-28549
HYDRAULIC CONTROL
Hydraulic tests of tanks for dangerous goods --- determination of the test pressure
[SP-RAPP-1982:01] N82-28683
HYDRAULIC TEST TUNNELS
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation
[TPD-908-720] N82-29116
HYDRAZINES
CO2 laser photoacoustic detection of hydrazine based rocket fuels
[AD-A112950] N82-28632
The consequences of hydrazine exposition and its treatment
[MBL-1981-2] N82-28996
HYDRIDES
Reduction of carbon monoxide. Past research summary
[DE82-007524] N82-28405
HYDROCARBON FUELS
Effect of hydrocarbon fuel type on fuel
[NASA-TM-82916] N82-28460
Conversion of hydrocarbons for fuel cell applications. Part 1: Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids. Part 2: Steam reforming of n-hexane on pellet and monolithic catalyst beds
[NASA-CR-169134] N82-28787
Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids N82-28788
Steam reforming of n-hexane on pellet and monolithic catalyst beds. A comparative study on improvements due to heat transfer N82-28789
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1
[AD-A113665] N82-28842
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, part 2
[AD-A113666] N82-28843
HYDROCARBONS
Rapid hydropyrolysis of sub-bituminous and bituminous coals
[DE82-000776] N82-28469
Heat pump operating with a mixture of fluids
[PB82-143611] N82-28602
Study of correlations in molecular motion by multiple quantum NMR
[DE82-005650] N82-29144
HYDRODYNAMIC EQUATIONS
Calculation of linear stability with the aid of asymptotic solutions of Orr-Sommerfeld equation. Part 1. The treatment of the linear stability problems for (alpha)R 1 containing one simple turning point; Two dimensional quasi-parallel flow: Jeffery-Hamel flow
[DE81-700130] N82-29086
HYDRODYNAMICS
A numerical investigation of the dynamics of liquid spray
[AD-A113378] N82-28586
HYDROELECTRIC POWER STATIONS
Small hydro-electric resource assessment: Hauraki area
[DE82-901428] N82-28757
Powerhouse-gate: Concept definition study
[DE82-006226] N82-28834
HYDROGEN
Thermotransport of hydrogen and deuterium in vanadium, niobium and tantalum alloys
[DE82-005453] N82-28424
Conversion of hydrocarbons for fuel cell applications. Part 1: Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids. Part 2: Steam reforming of n-hexane on pellet and monolithic catalyst beds
[NASA-CR-169134] N82-28787
Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids N82-28788
Determination of the intrinsic Q(3)/5(1) line intensity ratio of molecular hydrogen
[ATR-82(8415)-1] N82-29247
HYDROGEN EMBRITTLEMENT
Use of metallurgical variables and surface properties to control hydrogen embrittlement
[AD-A114190] N82-28420
Influences of gaseous environment on low growth-rate fatigue crack propagation in steels
[DE82-005134] N82-28423
HYDROGEN PRODUCTION
Thermochemical generation of hydrogen
[NASA-CASE-NPO-15015-1] N82-28368
Photocatalytic hydrogen production from water and intermetallic compound formation on single-crystal surfaces of titanium oxides
[DE82-004952] N82-28393
Kinetics of the reverse Deacon reaction
[DE82-005621] N82-28394
Rotary kiln for the solar decomposition of zinc sulfate
[DE82-004323] N82-28804
Evaluation of nonelectrical energy-transmission options
[DE82-000886] N82-28821
HYDROGEN SULFIDE
Strategies for steam handling and H2S abatement at geothermal power plants in the geysers area of Northern California
[DE82-001144] N82-28796
Upstream H2S removal from geothermal steam
[DE82-901293] N82-28847
HYDROGENATION
Rapid hydropyrolysis of sub-bituminous and bituminous coals
[DE82-000776] N82-28469
HYDROGEOLOGY
Hydrogeochemical and stream sediment reconnaissance basic data for Sheridan quadrangle, Wyoming
[DE82-002467] N82-28748
Hydrogeochemical and stream sediment reconnaissance basic data for Ophir, Alaska
[DE82-000851] N82-28753
Hydrogeochemical and stream sediment reconnaissance basic data for Cheyenne quadrangle, Wyoming
[DE82-000786] N82-28754
Hydrogeochemical and stream sediment reconnaissance basic data for Preston quadrangle, Wyoming; Idaho
[DE82-000783] N82-28755
Hydrogeochemical and stream sediment reconnaissance basic data for Tularosa quadrangle, New Mexico
[DE82-000787] N82-28756
Hydrogeochemical and stream sediment reconnaissance basic data for Silver City quadrangle, New Mexico; Arizona
[DE82-000852] N82-28761
Hydrogeochemical and stream sediment reconnaissance basic data for Brownfield quadrangle, New Mexico; Texas
[DE82-000855] N82-28762
HYDROGRAPHY
Laser hydrography in Australia
[AD-A113584] N82-28741
HYDROLOGY
US Geological Survey research in radioactive waste disposal, fiscal year 1979
[USGS-CIRC-847] N82-29145
Nevada nuclear waste storage investigations
[DE82-005879] N82-29149
HYDROLOGY MODELS
A Rand note: Policy analysis of water management for the Netherlands. Volume 17: Flood safety model for the Ijssel Lakes --- dike safety
[RAND/N-1500/17-NETH] N82-28693
HYDROPHONES
Preliminary study of the possibilities for the use of glass fibers in hydrophones
[TPD-1981-0-2(105.106)] N82-29115
HYDROTHERMAL SYSTEMS
Survey of commercial thermal-storage installations in the United States and Canada
[DE82-000131] N82-28797
Regional assessment of aquifers for thermal-energy storage. Volume 3: Appendices
[DE82-002505] N82-28829

HYGROSCOPICITY
Recent developments in hygrothermoviscoelastic analysis of composites N82-28676
HYPERCAPNIA
Possible impairment of respiratory regulation under hyperbaric nitrogen narcosis N82-28964
HYPERSONIC FLIGHT
Computational aerodynamics at Weapons Systems Research Laboratory
[AD-A112867] N82-28257
HYPOKINESIA
Condition of rats connective tissue during long-term hypokinesia and in recovery period N82-28969

I

ICE
Environmental satellite imagery, July 1981
[PN82-156894] N82-28922
Charged dislocations in ice. 2: Contribution of dielectric relaxation
[AD-A113936] N82-29204
ICE FORMATION
HISS calibration, ice phobics and FAA R/D evaluations
[AD-A114435] N82-28289
NORSEX: Total and multiyear ice concentration at Svalbard in September and October 1979, mapped by satellite microwave sensor at frequencies 37 GHz and 10 GHz
[PB82-160029] N82-28775
ICE MAPPING
NORSEX: Total and multiyear ice concentration at Svalbard in September and October 1979, mapped by satellite microwave sensor at frequencies 37 GHz and 10 GHz
[PB82-160029] N82-28775
IDENTIFYING
Algorithms for autonomous star identification
[NASA-TM-84789] N82-29031
IGNITERS
TNT equivalency of Cyclotol 70/30
[AD-A113270] N82-28459
IGNITION
Particle-beam fusion
[DE82-002900] N82-29183
IMAGE INTENSIFIERS
Night vision and electro-optics technology transfer, 1972 - 1981
[AD-A114134] N82-29167
IMAGE MOTION COMPENSATION
A multi-bit rate interface movement compensated multimode coder for video conferencing
[AD-A114121] N82-28527
A case for inherent geometric and geodetic accuracy in remotely sensed VNIR and SWIR imaging products N82-28737
IMAGE PROCESSING
Proceedings of the NASA Workshop on Registration and Rectification
[NASA-CR-169133] N82-28699
Workshop rationale N82-28700
Report of subpanel on feature extraction N82-28702
Report of subpanel on inter-image matching N82-28703
Report on the subpanel on remapping procedures N82-28704
Report of the subpanel on resampling functions N82-28705
Report of the Subpanel on Error Characterization and Error Budgets N82-28706
Needs for registration and rectification of satellite imagery for land use and land cover and hydrologic applications N82-28709
Registration and rectification needs of geology N82-28710
Oceanographic satellite remote sensing: Registration, rectification, and data integration requirements N82-28712
Spaceborne scanner imaging system errors N82-28713
Thematic mapper performance N82-28714
Scanner imaging systems, aircraft N82-28715
MLA imaging systems N82-28716
Geometric and rediametric distortion in spaceborne SAR imagery N82-28717
A discussion of image sharpness N82-28723
The digital step edge N82-28724
Inter-image matching N82-28725
Computational aspects of remapping digital imagery N82-28727
A quantitative assessment of resampling errors N82-28728
Geometric error characterization and error budgets — thematic mapper N82-28729
Geometric verification N82-28730
Modeling misregistration and related effects on multispectral classification N82-28733
Feasibility of B spline data reduction on remote sensing data
[NLR-TR-80023-U] N82-28767
LANDSAT/NAVPAK system description and user's guide
[NASA-TM-84782] N82-29024
Image segmentation using simple Markov, field models
[AD-A112914] N82-29162
IMAGE RECONSTRUCTION
Fine resolution imaging of space objects
[AD-A113911] N82-29160
IMAGE RESOLUTION
Proceedings of the NASA Workshop on Registration and Rectification
[NASA-CR-169133] N82-28699
Report of subpanel on image sharpness N82-28701
A discussion of image sharpness N82-28723
Fine resolution imaging of space objects
[AD-A113911] N82-29160
IMAGE VELOCITY SENSORS
Oceanographic satellite remote sensing: Registration, rectification, and data integration requirements N82-28712
IMAGERY
Report of the subpanel on methods of verification N82-28707
IMAGES
Fine resolution imaging of space objects
[AD-A113911] N82-29160
Application of phase retrieval
[AD-A113383] N82-29161
IMAGING TECHNIQUES
Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309
Method and apparatus for Delta K synthetic aperature radar measurement of ocean current
[NASA-CASE-NPO-15704-1] N82-28502
Map accuracy requirements: The cartographic potential of satellite image data N82-28721
A case for inherent geometric and geodetic accuracy in remotely sensed VNIR and SWIR imaging products N82-28737
IMP
Evaluation of the IMP-16 microprocessor orbit determination system filter
[NASA-TM-84788] N82-29026
IMPACT ACCELERATION
Problem of accelerations in aviation medicine N82-28950
IMPACT TESTS
Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267
IMPELLERS
Project Vulcan: The development of a gasdynamic heater. Volume 2: Heat transfer and performance analyses for a gasdynamic heater with helical impellers
[DE82-006788] N82-28595
IMPLOSIONS
Radiation from high temperature plasmas
[AD-A113597] N82-29177
INCOMPRESSIBLE FLOW
Airborne laser turret flow control: A parametric study of wind tunnel model conditions
[AD-A113557] N82-28255
INDUSTRIAL ENERGY
Thermal and economic analysis of solar-assisted heat pumps for low-temperature IPH applications
[DE82-006185] N82-28805
Evaluation of nonelectrical energy-transmission options
[DE82-000886] N82-28821
INDUSTRIAL PLANTS
Performance assessment of materials and components of the Westinghouse coal gasification process development unit
[DE82-005995] N82-28401
INDUSTRIAL SAFETY
Bureau of Mines research 1981: A summary of significant results in mineral technology and economics
[PB82-159971] N82-28776
Industrial machinery noise impact modeling, volume 1
[PB82-148099] N82-29121
INDUSTRIAL WASTES
The application of a bubbling mercury electrode to anodic stripping voltammetry. Determination of zinc, cadium, lead and copper in natural water and industrial waste
[DRIC-T-6565] N82-28791
US Geological Survey research in radioactive waste disposal, fiscal year 1979
[USGS-CIRC-847] N82-29145
INEQUALITIES
Khincin-Kullback-Leibler estimation with inequality constraints
[AD-A114326] N82-29101
INERTIAL CONFINEMENT FUSION
Particle-beam fusion
[DE82-002900] N82-29183
INERTIAL FUSION (REACTOR)
Inertial fusion program
[DE82-007361] N82-29189
INERTIAL REFERENCE SYSTEMS
Inertial surveying technology
[AD-A107379] N82-28863
INFORMATION DISSEMINATION
The organizing of conferences
[PB82-142696] N82-28948
INFORMATION FLOW
Establishment of the Data and Analysis Center for Software (DACS)
[AD-A113262] N82-29045
INFORMATION MANAGEMENT
Establishment of the Data and Analysis Center for Software (DACS)
[AD-A113262] N82-29045
INFORMATION RETRIEVAL
Telidon Videotex presentation level protocol: Augmented picture description instructions
[CRC-TN-709-E] N82-28499
INFORMATION SYSTEMS
Data vs. information: A system paradigm N82-28732
Automated collection of software engineering data in the Software Engineering Laboratory (SEL)
[NASA-TM-84766] N82-29043
Implementation of information technology in office settings: Review of relevant literature
[RAND-P-6697] N82-29224
INFORMATION THEORY
The ranking of displays based on transinformation — as a measure of tracking performance
[FB-52] N82-29001
Multi-sample cluster analysis with varying parameters using Akaike's information criterion
[AD-A113422] N82-29080
INFRARED ASTRONOMY
Activities report of the Institute for Extraterrestrial Physics
[MPI-PAE/EXTRATERR-172] N82-29245
INFRARED ASTRONOMY SATELLITE
BRDF measurements of sunshield and baffle materials for the IRAS telescope
[NASA-TM-84235] N82-29155
INFRARED DETECTORS
Structuring caused by Rayleigh-Taylor instability
[AD-A114085] N82-29181
INFRARED IMAGERY
The influence of the temperature coefficient of refractive index on a thermal imager
[RSRE-MEMO-3398] N82-29156
INFRARED INSTRUMENTS
Night vision and electro-optics technology transfer, 1972 - 1981
[AD-A114134] N82-29167
INFRARED LASERS
Laser-induced reactions of nitrogen fluorides with nitrogen oxides
[AD-A113667] N82-28626

INFRARED RADIATION
The development of a high average power glass laser source
[AD-A107527] N82-28621
Infrared transmittance of marine atmospheres --- sea surface temperature
[AD-A114414] N82-29164
INFRARED SPECTROSCOPY
Continuum absorption by H2O
[AD-A112264] N82-28372
INFRARED TELESCOPES
BRDF measurements of sunshield and baffle materials for the IRAS telescope
[NASA-TM-84235] N82-29155
Definition phase effort of the Spacelab-2 Infrared Telescope Experiment (IRT)
[NASA-CR-170424] N82-29243
INGOTS
Improved ingot slicing machine
[NASA-CASE-NPO-15483-1] N82-28642
INITIATION
Model of direct initiation of unconfined detonations
[AD-A107446] N82-28508
INJECTION MOLDING
Computer-aided injection molding system
[PB82-147810] N82-28490
INKS
Evaluation of thick-file inks for solar cell grid metallization
[DE82-005615] N82-28814
INLET FLOW
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249
INORGANIC COMPOUNDS
Inorganic halogen oxidizer research
[AD-A114196] N82-28382
INPUT
Automated Orbit Determination System (AODS) environment simulator for prototype testing (ADEPT) system description
[NASA-TM-84801] N82-29035
INPUTP (general purpose input processor). User guide
[AD-A114257] N82-29055
INSECTS
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Cultivation of insects as new branch of entomology - industrial entomology N82-28980
NASA report to educators, volume 10, no. 1
N82-29216
INSERTION
IRIG-Time synchronized binary video data inserter
[AD-A107119] N82-28506
INSPECTION
Electrothermal analytical response inspection of electroexplosive devices
[AD-A112328] N82-28461
Trend inspection station for printed circuit board soler joints, ultrasonic subsystem
[AD-A112918] N82-28655
INSTANTONS
Instantons in the quark plasma. The role of Fermion zero modes
[REPT-677] N82-29174
INSTRUMENT COMPENSATION
Automatic and continuous transducer-drift compensator for endpoint detection systems
[PB82-135534] N82-28614
INSTRUMENT ERRORS
Report of the Subpanel on Error Characterization and Error Budgets N82-28706
Spaceborne scanner imaging system errors
N82-28713
INSTRUMENT FLIGHT RULES
Evaluations of helicopter instrument-flight handling qualities
[AD-A114004] N82-28285
INSULATION
Study of the physics of insulating films as related to the reliability of metal oxide semiconductor (MOS) devices
[AD-A112501] N82-29201
INTEGRATED CIRCUITS
Conversion of algorithms to custom integrated circuit devices
[AD-A113822] N82-28553
INTEL 8080 MICROPROCESSOR
Intel 8080 orbit propagation program system description and user's guide
[NASA-TM-84783] N82-29025
INTELLECT
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Natural and social determination of human psyche
N82-28983
INTERFEROMETERS
Preliminary study of the possibilities for the use of glass fibers in hydrophones
[TPD-1981-0-2(105.106)] N82-29115
Compliant surfaces
[AD-A114309] N82-29166
INTERGRANULAR CORROSION
The Jominy end-quench test for investigation of corrosion properties and microstructure of high strength aluminum alloys
[NLR-TR-80102-U] N82-28434
INTERIOR BALLISTICS
The relationship between ballistic behavior and structural microdefects of T propellant. An application of SEM in the study of doublebase propellant
[AD-A114381] N82-28351
INTERMEDIATE FREQUENCY AMPLIFIERS
A true logarithmic IF frequency amplifier for radar applications
[RSRE-MEMO-3400] N82-28504
INTERMETALLICS
Proximity effect in Cu-NbSn composites
[DE82-005449] N82-28361
Search for superconductivity in ion-implanted b-Ge films
[IPNO-PHN-80-22] N82-29211
INTERMODULATION
Intermodulation analysis --- MSAT antenna
N82-28339
Nonlinear system identification technique validation
[AD-A112593] N82-28505
INTERNAL PRESSURE
Internal heat deposition in laser highly accelerated targets
[AD-A114206] N82-28639
INTERNAL WAVES
Preliminary results of line sensor test
[AD-A114313] N82-28939
INTERPLANETARY MAGNETIC FIELDS
On the nature of magnetic fields in the vicinity of Mars
[REPT-672] N82-29249
Distribution of the magnetic field in Halley's comet tail obtained from the plasma cloud kinetics
[REPT-673] N82-29250
Pioneer 10/11 data analysis of the magnetic field experiment
[NASA-CR-166366] N82-29251
Solar wind magnetic field penetration into cometary ionospheres
[REPT-685] N82-29254
INTERPOLATION
Unconstrained minimization by interpolation: Rates of convergence
[AD-A114115] N82-29082
INTERPROCESSOR COMMUNICATION
Optimixing synchronous systems
[AD-A113916] N82-29015
INTERSTELLAR GAS
Neutral interstellar gas in the lower galactic halo
N82-29246
INTERSTELLAR MATTER
Neutral interstellar gas in the lower galactic halo
N82-29246
INVERSE SCATTERING
A literature survey on inverse scattering for electron density profile determination, volume 2
[AD-A113088] N82-28862
INVESTMENTS
Photovoltaics and electric utilities --- capital investment and revenue requirement
[DE82-006994] N82-28833
INVISCID FLOW
Calculation of three-dimensional, inviscid supersonic, steady flows
[NASA-CR-3573] N82-28246
ION ACCELERATORS
Stability of charged beam propagation through a relativistic hollow electron beam
[AD-A113529] N82-29128
ION BEAMS
Characterization of solids and surfaces using ion beams and mass spectrometry
[AD-A112904] N82-28376
Ion beam sputter deposited diamond like films
[NASA-TM-82873] N82-28445
Stability of charged beam propagation through a relativistic hollow electron beam
[AD-A113529] N82-29128
Plasmas in particle accelerators: A hydrodynamic model of three-dimensional electrostatic instabilities
[DE82-006182] N82-29186
ION CONCENTRATION
Structuring caused by Rayleigh-Taylor instability
[AD-A114085] N82-29181
ION DENSITY (CONCENTRATION)
The influence of a background plasma on the diocotron instability of a relativistic hollow electron beam
[AD-A113530] N82-29127
ION DISTRIBUTION
Ion emission characteristics of plasma focus devices
[IPF-81-9] N82-29197
ION EMISSION
Ion emission characteristics of plasma focus devices
[IPF-81-9] N82-29197
ION ENGINES
Electric propulsion --- pulsed plasma thruster and electron bombardment ion engine for MSAT attitude control and stationkeeping N82-28341
ION EXCHANGING
Charge transfer spectra and photoelectron emission by solutions
[AD-A114054] N82-29126
ION IMPLANTATION
Quantitative thermal desorption spectrometry of ionically implanted inert gases. 2: Technical requirements N82-28371
Preparation of large-diameter GaAs crystals
[AD-A107395] N82-29202
ION IRRADIATION
Innovative measurement technology for the semiconductor device industry based on electron spectroscopy
[PB82-135922] N82-28615
ION MOTION
Ion motion in the plasma focus
[IPF-81-11] N82-29198
ION PLATING
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260
ION PROPULSION
A dc to dc converter --- raising battery voltage in an ion propulsion system
[NASA-CASE-MFS-25430-1] N82-28550
ION SOURCES
RF plasma sources for neutral-beam-injection systems. Phase 1: Definition study
[DE82-004193] N82-29182
Heat removal from the simulation electrode of a high power log pulse ion source
[DE81-700008] N82-29192
ION TEMPERATURE
Turbulent heating and filament structure of field-aligned current with anomaous resistivity
[REPT-680] N82-28855
IONIC COLLISIONS
Meson production in relativistic-heavy-ion collisions
[DE82-005652] N82-29141
IONIZATION
The electron avalanche ionization of air and a simple air chemistry model
[AD-A113501] N82-28864
Numerical study of the Columbia high-beta device: Torus-2
[DE82-007363] N82-29187
IONIZATION CROSS SECTIONS
Effect of vibrational excitation on the dynamics of ion molecule reactions
[DE82-004951] N82-29135

IONOSPHERE
Total electron content variations at mid-and high-latitudes
[AD-A113683] N82-28860
Electron beam transport in the ionosphere: Energy deposition and optical emissions based upon the combined effects of plasma turbulence and particle-particle interactions
[AD-A114376] N82-28868

IONOSPHERIC CONDUCTIVITY
Solar wind magnetic field penetration into cometary ionospheres
[REPT-685] N82-29254

IONOSPHERIC DISTURBANCES
Modeling of high-latitude currents in a substorm
[AD-A114311] N82-28865
Airglow imaging studies of natural and artificially induced ionospheric disturbances
[AD-A114369] N82-28866
Electron beam transport in the ionosphere: Energy deposition and optical emissions based upon the combined effects of plasma turbulence and particle-particle interactions
[AD-A114376] N82-28868

IONOSPHERIC ELECTRON DENSITY
A literature survey on inverse scattering for electron density profile determination, volume 2
[AD-A113088] N82-28862

IRON ALLOYS
Stress corrosion cracking of alloy 600
[DE82-901313] N82-28429
Consolidation of an iron-base superalloy by powder metallurgy techniques
[PB82-135906] N82-28493

IRON ISOTOPES
Mechanistic chemistry of some transition metal complexes
[DE82-005577] N82-28425

ISCHEMIA
Synchronization of cardiovascular accidents with physical clocks N82-28956

ISOLATION
Environmental data for sites in the National Solar Data Network, October 1981
[DE82-002706] N82-28850

ISOTROPIC MEDIA
Bending of a Ray in a random inhomogeneous medium
[PB82-148966] N82-28543

IUE
The first three years of IUE
[RL-81-091] N82-29242

J

JET AIRCRAFT
Gust response of commerical jet aircraft including effects of autopilot operation
[NASA-CR-165919] N82-28266

JET AIRCRAFT NOISE
Static noise tests on modified augmentor wing jet STOL research aircraft
[NASA-TM-81231] N82-28295
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111
Some comments on the prediction of forward flight effects on jet noise
[MPIS-20/1981] N82-29118

JET ENGINE FUELS
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463

JET ENGINES
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296
CF6 jet engine performance improvement: High pressure turbine active clearance control
[NASA-CR-165556] N82-28297

JET FLOW
A general method to determine the stability of compressible flows
[NASA-CR-169129] N82-28572
Entrainment modelling of buoyant momentum jets in water
[AD-A112797] N82-28580

JET MIXING FLOW
Research on augmentation of turbulent mixing
[AD-A114310] N82-28591

JOINTS (JUNCTIONS)
The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476
Damping in structural joints N82-28478

JP-4 JET FUEL
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464

JUPITER (PLANET)
Pioneer 10/11 data analysis of the trapped radiation experiment
[NASA-CR-166360] N82-28312

K

KALMAN FILTERS
LRIR observations of the structure and propagation of the stationary planetary waves in the Northern Hemisphere during December 1975
[PB82-156639] N82-28921
Evaluation of the IMP-16 microprocessor orbit determination system filter
[NASA-TM-84788] N82-29026

KAON PRODUCTION
Meson production in relativistic-heavy-ion collisions
[DE82-005652] N82-29141

KEVLAR (TRADEMARK)
Tensile and fatigue strength properties of Kevlar 29 aramid/epoxy unidirectional composites --- used in flywheels
[DE82-006777] N82-28362

KINEMATICS
Kinematic investigation Hughes Helicopter 7.62mm chain gun
[AD-A113114] N82-28287

KINETIC ENERGY
Quantitative thermal desorption spectrometry of noble gases in solids N82-28369

KUTTA-JOUKOWSKI CONDITION
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249

L

LABYRINTH
Preparation of labyrinthectomied animals for flight aboard Cosmos-936 biosatellite N82-28971

LABYRINTHECTOMY
Preparation of labyrinthectomied animals for flight aboard Cosmos-936 biosatellite N82-28971

LAKES
A Rand note: Policy analysis of water management for the Netherlands. Volume 3: Screening of eutrophication control tactics
[RAND/N-1500/3-NETH] N82-28691
A Rand note: Policy analysis of water management for the Netherlands. Volume 17: Flood safety model for the Ijssel Lakes --- dike safety
[RAND/N-1500/17-NETH] N82-28693
Water resources data for Mississippi, water year 1980
[PB82-149006] N82-28773
Water resources data for Alabama, water year 1980. Volume 1: Apalachicola Choctawatchee, Blackwater, Escambia, Perdidio, and Alabama River Basins
[PB82-164112] N82-28777
Storm warnings on Lake Balaton
[AD-A114322] N82-28909

LAMINAR BOUNDARY LAYER
Finite-difference solution of the compressible stability eignevalue problem
[NASA-CR-3584] N82-28573
Study of boundary-layer transition using transonic cone Preston tube data
[NASA-CR-169130] N82-28579

LAMINAR FLOW
Influence of surface static-pressure orifices on boundary-layer transition --- tests conducted in the Langley Low-Turbulence Pressure Tunnel
[NASA-TM-84492] N82-28248
Computation of laminar and turbulent flow in 90 deg square duct and pipe bends using the Navier-Stokes equations
[AD-A114258] N82-28589

LAMINATES
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280
An optimal design of simple symmetric laminates under the first ply failure criteria
[AD-A113689] N82-28357
Fifteen years experience with composite propeller blades --- for hovercraft N82-28363
Damage development mechanisms in notched graphite epoxy composite laminates during compressive fatigue loading
[PB82-142316] N82-28367

LAND MANAGEMENT
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689

LAND MOBILE SATELLITE SERVICE
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies. Part 1: Executive summary
[NASA-CR-169135] N82-28325
Land Mobile Satellite Service N82-28326
LMSS telecommunication network design N82-28327
MSAT design N82-28328
Mobile vehicle antenna N82-28329
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report
[NASA-CR-169136] N82-28330
Introduction N82-28331
LMSS communication network design N82-28332
Satellite system design N82-28333
The ground segment N82-28334
The technology N82-28335

LAND USE
Inventory of available data elements for the San Bernardino, California region
[NASA-CR-166354] N82-28698
Economic analysis based on land costs of collector spacing in a collector field
[DE82-004519] N82-28820

LANDMARKS
LANDSAT/NAVPAK system description and user's guide
[NASA-TM-84782] N82-29024

LANDSAT D
Spacecraft induced error sources N82-28718
Geometric error characterization and error budgets --- thematic mapper N82-28729
GPSPAC/LANDSAT-D Interface (GLI) system user's guide
[NASA-TM-84784] N82-29038
System description for the Global Positioning Subsystem Experiment Package (GPSPAC) Experiment Data Preprocessor (GEDAP)
[NASA-TM-84785] N82-29039

LANDSAT SATELLITES
The use of terrain height information for improving the accuracy of classification of LANDSAT data
[RAE-TM-SPACE-297] N82-28696

LANDSAT 2
Spacecraft induced error sources N82-28718

LAP JOINTS
Properties of organic matrix short fiber composites
[AD-A113606] N82-28358

LAPLACE TRANSFORMATION
Inverse of a Laplace transform and its numerical evaluation
[DE82-004667] N82-29085

LARGE SCALE INTEGRATION
Technical guidelines for LSI hybrid microcircuits
[AD-A114437] N82-28562

LARGE SPACE STRUCTURES
Controllability of inherently damped large flexible space structures
[NASA-CR-169127] N82-28345

Preliminary sizing of vibration absorber for space mast structures
[NASA-TM-84488] N82-28346

LASER ANEMOMETERS
Laser anemometer using a Fabry-Perot interferometer for measuring mean velocity and turbulence intensity along the optical axis in turbomachinery
[NASA-TM-82841] N82-28605

LASER APPLICATIONS
The use of a perfectly conducting sphere to excite the plasmon of a flat surface. 1: Calculation of the local field with applications to surface enhanced spectroscopy
[AD-A114278] N82-28384
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004180] N82-28390
Arrangement for damping the resonance in a laser diode
[NASA-CASE-NPO-15990-1] N82-28618

LASER DAMAGE
Long-term and progressive changes in Rhesus spectral sensitivity after low-level coherent light (514nm exposure) --- effects of laser exposure on visual function
[AD-A111639] N82-28946

LASER FUSION
Inertial fusion program
[DE82-007361] N82-29189

LASER HEATING
Sinterable powders from laser driven reactions
[AD-A114062] N82-28628

LASER INTERFEROMETRY
Miniature interferometer transducer: An optical system description and cost analysis
[DE82-004653] N82-29168

LASER MATERIALS
The development of a high average power glass laser source
[AD-A107527] N82-28621

LASER OUTPUTS
High power metallic halide laser --- amplifying a copper chloride laser
[NASA-CASE-NPO-14782-1] N82-28616
Design support of a rare gas halide laser
[AD-A112464] N82-28622

LASER PROPULSION
Airborne laser turret flow control: A parametric study of wind tunnel model conditions
[AD-A113557] N82-28255

LASER PUMPING
Energy paths in chemical reactions
[AD-A114191] N82-28609
Fluorescent glasses for use in fluorescently pumping Nd-3(+) doped laser glass
[AD-A107503] N82-28620
Electron-beam sustained mercuric bromide laser study
[AD-A114246] N82-28634

LASER RANGE FINDERS
Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking
[NASA-TM-73298] N82-28690
Laser hydrography in Australia
[AD-A113584] N82-28741

LASER TARGET INTERACTIONS
Compton effect in the SPS: Its application in beam profile measurement
[DE82-002534] N82-29136

LASER TARGETS
Internal heat deposition in laser highly accelerated targets
[AD-A114206] N82-28639
Inertial fusion program
[DE82-007361] N82-29189

LASER WELDING
Comparison of laser welds in two stainless steels
[DE82-004699] N82-28651

LASERS
A semi-analytical model for laser-induced ablation of fibre resin composites
[MRL-R-844] N82-28354
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004179] N82-28388
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624
Sinterable powders from laser driven reactions
[AD-A114062] N82-28628
Thermo-optical properties of optical glasses
[DE82-003681] N82-29169

LATTICE PARAMETERS
Effects of cobalt on the microstructure of Udimet 700
[NASA-CR-165605] N82-28409

LAUNCH VEHICLES
China's ballistic missile program
[AD-A114260] N82-28321
Future satellite carriers --- best choice for a carrier rocket for the 90's
[TUM-LRT-TB-81/6] N82-29248

LAVA
Elastomechanical methods in the exploration of the Valles Caldera, New Mexico
[DE82-006923] N82-28766

LEAD (METAL)
Electrolytic method for recovery of lead from scrap batteries
[PB82-141045] N82-28437
Search for superconductivity in ion-implanted b-Ge films
[IPNO-PHN-80-22] N82-29211

LEAD ACID BATTERIES
Electrolytic method for recovery of lead from scrap batteries
[PB82-141045] N82-28437
Application, sizing, testing and performance of the photovoltaic battery subsystem at Natural Bridges National Monument, Utah
[DE82-007040] N82-28832

LEADING EDGE FLAPS
The attached flow over a slender delta wing with leading-edge flaps
[RAE-TR-81150] N82-28254

LEADING EDGES
Computation of turbulent horseshoe vortex flow past swept and unswept leading edges
[AD-A113534] N82-28584

LEARNING
Adapative motivation theory
[AD-A111195] N82-28997

LEAST SQUARES METHOD
Least squares adjustment of large-scale geodetic networks by orthogonal decomposition
[DE82-002253] N82-28758
Comparison of some methods for solving sparse linear least squares problems
[DE82-004651] N82-29084

LEE WAVES
The effects of moisture on mountain lee waves
[PB82-156621] N82-28920

LEG (ANATOMY)
Osteoporosis in unsupported extremities
N82-28970

LENSES
Dielectric lens antenna for EHF airborne satellite communication terminals
[AD-A113250] N82-28515
Alkali halide FLIR lens development
[AD-A113845] N82-29158

LIBRARIES
Systems Technology Laboratory (STL) library methods and procedures
[NASA-TM-84787] N82-29032

LIFE (DURABILITY)
Lifetimes and production properties of charmed particles
[DE82-005302] N82-29140

LIFE CYCLE COSTS
Economic analysis of small wind-energy-conversion systems for ten MASEC sites
[DE82-003976] N82-28815
Bicycle 2: A computer code for calculating levelized life-cycle costs
[DE82-001865] N82-29058

LIFE SUPPORT SYSTEMS
Nutrition and food technology for a Controlled Ecological Life Support System (CELSS)
[NASA-CR-167392] N82-29004
A design methodology for nonlinear systems containing parameter uncertainty: Application to nonlinear controller design
[NASA-CR-166358] N82-29005

LIGANDS
Coordination chemistry of several radius-sensitive complexones and applications to lanthanide-actinide separations
[DE82-005547] N82-28396

LIGHT EMITTING DIODES
Photoelectric detection system --- manufacturing automation
[NASA-CASE-MFS-23776-1] N82-28545

LIGHT TRANSMISSION
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624
Equipment and tracking test results for the NRL ship-to-ship DF laser transmission experiment
[AD-A113485] N82-28631
Atmospheric transmittance/radiance computer code FASCOD2
[AD-A113825] N82-28859

LIGHTNING
A compendium of lightning effects on future aircraft electronic systems
[AD-A114117] N82-28293
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364

LIMBS (ANATOMY)
Osteoporosis in unsupported extremities
N82-28970

LIMESTONE
Economics of spray-dryer FGD system: The two-stage open-loop processes
[DE82-900158] N82-28846

LINE OF SIGHT
Unconventional visual displays for flight training
[AD-A111392] N82-28999

LINE SPECTRA
Continuum absorption by H2O
[AD-A112264] N82-28372
Astronomical Society information number 55. Report of the meeting --- conference
[ISSN-0374-1958] N82-29241
Determination of the intrinsic Q(3)/5(1) line intensity ratio of molecular hydrogen
[ATR-82(8415)-1] N82-29247

LINEAR ARRAYS
MLA imaging systems N82-28716
Attitude tracker N82-28736
A concept for a future ground control data set for image correction N82-28738
Preliminary results of line sensor test
[AD-A114313] N82-28939
On the power output of some idealized source configurations with one or more characteristic dimensions
[NASA-CR-169132] N82-29074

LINEAR EQUATIONS
Comparison of some methods for solving sparse linear least squares problems
[DE82-004651] N82-29084
Some computational aspects of the boundary collocation method for linear partial differential equations and related questions
[TRITA-NA-8119] N82-29090
Multiple step G-contractivity with applications to slowly varying linear systems
[TRITA-NA-8107] N82-29092

LINEAR PROGRAMMING
Program package for solving linear optimization problems. User's manual
[DE81-700125] N82-29065
The 10th IFIP Conference on System Modeling and Optimization
[AD-A113126] N82-29104
Handling artificial variables in a simplex method. A commentary
[AD-A114133] N82-29105
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901280] N82-29106

LINEAR SYSTEMS
Multiple step G-contractivity with applications to slowly varying linear systems
[TRITA-NA-8107] N82-29092

LIQUID CHROMATOGRAPHY
The role of microorganisms in marine corrosion processes
[AD-A114424] N82-28386

Octanol/water partition coefficients and aqueous solubilities of organic compounds
[PB82-141797] N82-28408

LIQUID COOLING
Experimental heat transfer coefficients for the cooling of oil in horizontal internal forced convective transitional flow
[PB82-142993] N82-28601

LIQUID CRYSTALS
NMR studies of oriented molecules
[DE82-005258] N82-29134
Liquid crystal materials for matrix displays
[AD-A114444] N82-29207

LIQUID FUELS
Production of liquid fuels out of plant biomass and refuse: Methods, cost, potential
[IKE-K-68] N82-28838
Bicycle 2: A computer code for calculating levelized life-cycle costs
[DE82-001865] N82-29058

LIQUID HELIUM
Experimental investigation of the circulation and the propagation of macroscopic ring vortices in He 2
[MPIS-16/1981] N82-28598

LIQUID METALS
Advanced machinery liquid metal wetting, cleaning and materials compatibility study
[AD-A113294] N82-28480

LIQUID NITROGEN
Environmental chamber low temperature cutoff
[DE82-007626] N82-28316

LIQUID PHASE EPITAXY
Preparation of large-diameter GaAs crystals
[AD-A107395] N82-29202

LIQUID PHASES
A numerical investigation of the dynamics of liquid spray
[AD-A113378] N82-28586

LIQUID ROCKET PROPELLANTS
Rockets and astronautics. (Lexicon contribution)
[TUM-LRT-TB-81/11] N82-28352

LISTS
Program listings for EOSAEL 80-B and ancillary codes AGAUS and FLASH. Volume 2: User's manual supplement
[AD-A114417] N82-29054

LITHIUM COMPOUNDS
Investigations on the nature and reactivity of compounds formed between lithium and carbon black
[AD-A113116] N82-28378
Super hydrides
[AD-A113229] N82-28449

LITHIUM HYDRIDES
Initial stages of oxidation on single crystals of lithium hydride interaction between single crystal lithium hydride and a stainless steel, high vacuum container
[DE82-005614] N82-29212

LITHIUM OXIDES
Lithium oxide in the Li(Si)/FeS2 thermal battery system
[DE82-005114] N82-28818

LITHIUM SULFUR BATTERIES
Lithium oxide in the Li(Si)/FeS2 thermal battery system
[DE82-005114] N82-28818

LOAD TESTS
Method and apparatus for transfer function simulator for testing complex systems
[NASA-CASE-NPO-15696-1] N82-28619

LOADS (FORCES)
Quasi-square hole with optimum shape in an infinite plate subjected in in-plane loading. Optimization of inner and outer boundaries of beams and plates with holes
[AD-A114370] N82-28679

LOGARITHMIC RECEIVERS
A true logarithmic IF frequency amplifier for radar applications
[RSRE-MEMO-3400] N82-28504

LOGIC CIRCUITS
Conversion of algorithms to custom integrated circuit devices
[AD-A113822] N82-28553

LOGISTICS MANAGEMENT
Study of increasing lead times in major weapon systems acquisition
[AD-A113459] N82-29221

LONG DURATION EXPOSURE FACILITY
SD/LDEF technical User's Manual
[AD-A113504] N82-28324

LONG DURATION SPACE FLIGHT
Dynamics of left ventricular systolic phase structure during long-term (140-185 days) spaceflights N82-28954

LONG TERM EFFECTS
Investigation of the long term behavior of heat pipes
[IKE-5-215] N82-28597
New look at long-term collector performance and utilizability
[DE82-005259] N82-28799
Reports from the German Meteorological Service. Number 158: Contribution to phenology of Europe 4 long term phenological observation series ... western, central, and eastern Europe
[ISSN-0072-4130] N82-28876

LONGITUDINAL CONTROL
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298

LORAN C
Evaluation of various navigation system concepts
[AD-A112919] N82-28275
Flight evaluation of LORAN-C in the State of Vermont
[NASA-TM-84711] N82-28278

LORENTZ TRANSFORMATIONS
Electrodynamics: A consequence of nonlinear realizations of the Lorentz group
[DE82-004775] N82-28531

LOSSY MEDIA
The frequency shift of a pulse by a time-independent, dispersive, lossy medium
[PB82-161977] N82-28542

LOUVERS
Solar concentrator protective system
[NASA-CASE-NPO-15662-1] N82-28785

LOW TEMPERATURE ENVIRONMENTS
Test methods for plastic windows --- Swedish standards
[SP-A-82:02] N82-28684

LOW VOLTAGE
Low voltage free electron laser optics
[AD-A113659] N82-28625

LUBRICANTS
Consolidation of an iron-base superalloy by powder metallurgy techniques
[PB82-135906] N82-28493

LUMINAIRES
Electrodeless fluorescent lamp
[DE82-005147] N82-28564

LUTETIUM ISOTOPES
Acquisition and performance evaluation of a quadrupole mass spectrometer in a mobile laboratory --- for isotopic analysis
[DE82-004668] N82-28611

M

MACH NUMBER
Calibration and application of a combination temperature-pneumatic probe for velocity and rotor loss distribution measurements in a compressor
[AD-A113834] N82-28608

MACHINERY
Fatigue design of machine elements N82-28660

MAGNESIUM ALLOYS
The influence of solution treatment time and quench rate on microstructure and mechanical properties of high magnesium aluminum magnesium alloys
[AD-A113826] N82-28413

MAGNET COILS
Tokamaks with high-performance resistive magnets: Advanced test reactors and prospects for commercial applications
[DE82-007366] N82-29188

MAGNETIC COILS
Stability of superconducting ISABELLE dipole magnets
[DE82-006843] N82-29190

MAGNETIC COMPASSES
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291

MAGNETIC COOLING
Performance predictions for a room temperature, Ericsson cycle, magnetic heat pump
[AD-A114348] N82-28593

MAGNETIC CORES
Use of metallic glasses in magnetic switching
[DE82-006736] N82-28456

MAGNETIC DIPOLES
Stability of superconducting ISABELLE dipole magnets
[DE82-006843] N82-29190

MAGNETIC FIELDS
Electric and magnetic fields
[NASA-CR-165604] N82-28350
High gradient magnetic separation applied to liquid-liquid separation
[PB82-142811] N82-28495
Computer program description: An improved finite element program for three-dimensional electromagnetic problems
[PB82-134636] N82-28541
Power spectra of geomagnetic fluctuations between 0.02 and 20 Hz
[AD-A113848] N82-28861

MAGNETIC FLUX
Use of metallic glasses in magnetic switching
[DE82-006736] N82-28456
Performance predictions for a room temperature, Ericsson cycle, magnetic heat pump
[AD-A114348] N82-28593

MAGNETIC LEVITATION VEHICLES
The Transrapid test system in Emsland --- magnetic levitation railway
[MBB-543/81-O] N82-29237

MAGNETIC MATERIALS
Investigation for low-cost permanent magnets
[AD-A107392] N82-29109

MAGNETIC MEASUREMENT
On the nature of magnetic fields in the vicinity of Mars
[REPT-672] N82-29249

MAGNETIC MIRRORS
Mirror fusion test facility status
[DE82-006187] N82-29185

MAGNETIC PROPERTIES
Magnetic properties of alloys containing mischmetal, cobalt, copper, iron, and magnesium
[PB82-158940] N82-28439
Investigation for low-cost permanent magnets
[AD-A107392] N82-29109

MAGNETIC RESONANCE
Structural and electronic studies of defects in amorphous silicon
[DE82-004477] N82-29213

MAGNETIC STORMS
Modeling of high-latitude currents in a substorm
[AD-A114311] N82-28865

MAGNETIC SURVEYS
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 1
[DE82-005544] N82-28744
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745
Airborne gamma-ray spectrometer and magnetometer survey, New Rockford quadrangle, North Dakota
[DE82-005535] N82-28746
Airborne gamma-ray spectrometer and magnetometer survey: New Rockford quadrangle, North Dakota, Volume 2
[DE82-005569] N82-28747
Airborne gamma-ray spectrometer and magnetometer survey: Crescent quadrangle, Burns quadrangle, Canyon City quadrangle, Bend quadrangle, Salem quadrangle (Oregon)
[DE81-029063] N82-28749
Airborne gamma-ray spectrometer and magnetometer survey Coos Bay, Oregon, volume 1
[DE82-005534] N82-28750
Airborne gamma-ray spectrometer and magnetometer survey, Roseburg Quadrangle, Oregon, volume 1
[DE82-005536] N82-28765

MAGNETIC SUSPENSION
High gradient magnetic separation applied to liquid-liquid separation
[PB82-142811] N82-28495

MAGNETIC SWITCHING
Use of metallic glasses in magnetic switching
[DE82-006736] N82-28456
MAGNETOACOUSTIC WAVES
Confinement and magnetoacoustic heating of a low density belt pinch plasma
[IPF-81-8] N82-29196
MAGNETOHYDRODYNAMIC FLOW
Production of a fast high density plasma flow
[TUM-LRT-TB-81/14] N82-29194
Solar wind magnetic field penetration into cometary ionospheres
[REPT-685] N82-29254
MAGNETOHYDRODYNAMIC STABILITY
The influence of a background plasma on the diocotron instability of a relativistic hollow electron beam
[AD-A113530] N82-29127
Stability of charged beam propagation through a relativistic hollow electron beam
[AD-A113529] N82-29128
Drift resistive interchange and tearing modes in cylindrical geometry
[AD-A113499] N82-29179
Structuring caused by Rayleigh-Taylor instability
[AD-A114085] N82-29181
Mirror fusion test facility status
[DE82-006187] N82-29185
Plasmas in particle accelerators: A hydrodynamic model of three-dimensional electrostatic instabilities
[DE82-006182] N82-29186
MHD stability analysis code ERATO-J. User's manual of JAERI version ERATO
[DE81-700373] N82-29191
Toroidal plasma MHD equilibrium code EQUCIR version 1
[DE81-700128] N82-29193
MAGNETOMETERS
Study of low energy electron flux and its reaction to active experimentation on Spacelab --- development of electronic units
[INW-8101] N82-28612
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 1
[DE82-005544] N82-28744
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745
Airborne gamma-ray spectrometer and magnetometer survey, New Rockford quadrangle, North Dakota
[DE82-005535] N82-28746
MAGNETOSPHERE
Turbulent heating and filament structure of field-aligned current with anomaous resistivity
[REPT-680] N82-28855
Pioneer 10/11 data analysis of the magnetic field experiment
[NASA-CR-166366] N82-29251
MAGNETRONS
The development and application of the magnetron
[AD-A114155] N82-28560
MAGNETS
Magnetic properties of alloys containing mischmetal, cobalt, copper, iron, and magnesium
[PB82-158940] N82-28439
Investigation for low-cost permanent magnets
[AD-A107392] N82-29109
MAINE
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Bangor International/Dow AFB, Maine. Parts A-F
[AD-A113178] N82-28896
MAINTAINABILITY
Software maintenance: Improvement through better development standards and documentation
[AD-A113257] N82-29047
MAINTENANCE
Earth Terminal Measurement System maintenance manual, addendum
[PB82-151994] N82-28544
Traffic capacity through work zones on urban freeways
[PB82-143009] N82-29239
Sight distance requirements at lane closure work zones on urban freeways
[PB82-142290] N82-29240
MAN MACHINE SYSTEMS
Rule-based programming for human-computer interface specification
[AD-A113036] N82-29007
Computer-generated speech
[DE82-004672] N82-29063
Implementation of information technology in office settings: Review of relevant literature
[RAND-P-6697] N82-29224
MANAGEMENT INFORMATION SYSTEMS
Virtual memory management
[DE82-000908] N82-29061
Environmental files and data bases. Part A: Introduction and cceanographic management information system
[AD-A113687] N82-29226
Requirements and alternatives for a management information system to support hazardous waste enforcement
[PB82-154410] N82-29231
MANAGEMENT PLANNING
Preliminary analysis of technical risk and cost uncertainty in selected DARPA programs
[AD-A107402] N82-29218
PLANNERS' WORKBENCH: A computer aid to the re-planning
[AD-A113331] N82-29219
Concepts, the Journal of Defense Systems Acquisition Management, Autumn 1981, volume 4, number 4
[AD-A113130] N82-29220
Study of increasing lead times in major weapon systems acquisition
[AD-A113459] N82-29221
Case studies of innovation in R and D planning
[DE82-901277] N82-29222
Realistic approach to the planning of high technology, high risk projects
[DE82-001049] N82-29223
MANGANESE
Manganese nodule resource data, Sea Scope expedition
[PB82-142571] N82-28768
MANIFOLDS (MATHEMATICS)
A method for the circulation of invariant manifolds in hydrodynamic stability problems
[PB82-158825] N82-28603
Detection, estimation, and control on group manifolds
[AD-A113019] N82-29107
MANNED SPACE FLIGHT
Nutrition and food technology for a Controlled Ecological Life Support System (CELSS)
[NASA-CR-167392] N82-29004
MANUAL CONTROL
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302
Biomechanical analysis of tasks involving manual materials handling
[AD-A113955] N82-29009
MANUALS
Software Engineering Principles
[AD-A113415] N82-29048
MANUFACTURING
Low cost 2-D heatshield materials --- braided tapes
[AD-A113928] N82-28355
Development of materials and manufacturing technology over the next 20 years: Composite materials
[MBB-UD-341-82-O] N82-28365
Photoelectric detection system --- manufacturing automation
[NASA-CASE-MFS-23776-1] N82-28545
Ultra-lightweight mirror manufacturing and radiation response study
[AD-A106998] N82-29157
MAPPING
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689
Report on the subpanel on remapping procedures N82-28704
Map accuracy requirements: The cartographic potential of satellite image data N82-28721
Inter-image matching N82-28725
Photogrammetric aspects of remapping procedures N82-28726
Computational aspects of remapping digital imagery N82-28727
An automated mapping satellite system N82-28734
Mini raster-to-vector conversion
[AD-A113004] N82-28742
User's guide for the Total-Ozone Mapping Spectrometer (TOMS) instrument first year ozone T data set
[NASA-RP-1096] N82-28880
MAPS
Map accuracy requirements: The cartographic potential of satellite image data N82-28721
Map projections for larger-scale mapping N82-28722
MARINE BIOLOGY
Biota and biological principles of the aquatic environment
[CIRC-848-A] N82-28688
MARINE ENVIRONMENTS
Equipment and tracking test results for the NRL ship-to-ship DF laser transmission experiment
[AD-A113485] N82-28631
Marine sciences group
[DE82-005145] N82-28940
Monitoring technologies for ocean disposal of radioactive waste
[RAND/R-2773-NOAA] N82-29146
Infrared transmittance of marine atmospheres --- sea surface temperature
[AD-A114414] N82-29164
Environmental files and data bases. Part A: Introduction and oceanographic management information system
[AD-A113687] N82-29226
MARINE PROPULSION
Fundamentals of electrical propulsion plant design
[AD-A114423] N82-28561
MARINE RESOURCES
Manganese nodule resource data, Sea Scope expedition
[PB82-142571] N82-28768
MARKETING
Electric vehicles: Limited range and high costs hamper commercialization
[EMD-82-38] N82-29234
MARKOV PROCESSES
Rule-based programming for human-computer interface specification
[AD-A113036] N82-29007
Image segmentation using simple Markov, field models
[AD-A112914] N82-29162
MARS ENVIRONMENT
On the nature of magnetic fields in the vicinity of Mars
[REPT-672] N82-29249
MARTENSITIC STAINLESS STEELS
Fatigue properties of quatough steels Fe/4Cr/XMn/0.25C
[DE82-005140] N82-28421
Investigation of the tensile deformation and fracture of dual-phase steel
[DE82-007522] N82-28682
MASKING
Computer-assisted circuit design masks for the production of microwave circuits
[PB82-140153] N82-28494
MASS SPECTROSCOPY
Characterization of solids and surfaces using ion beams and mass spectrometry
[AD-A112904] N82-28376
MASS TRANSFER
Determination of the effect of composition, structure and electrochemical mass transport properties on adhesion and corrosion inhibition of paint films
[AD-A113975] N82-28448
MATCHING
Report of subpanel on inter-image matching N82-28703
MATERIAL ABSORPTION
Effect of applied stress, thermal environment and water in epoxy resins
[AD-A113016] N82-28450
MATERIALS HANDLING
Analysis of Dense-Phase Fine-Coal Pneumatic Systems
[DE82-010243] N82-28759
Biomechanical analysis of tasks involving manual materials handling
[AD-A113955] N82-29009

Deposition of highly active nuclear wastes
[TUM-LRT-TB-81/3] N82-29153

MATERIALS RECOVERY

Evaluation of potential processes for recovery of metals from coal ash. Volume 2: Laboratory data and cost estimates
[DE82-005592] N82-28428

A pyrometallurgical method for processing Ni-Cd scrap batteries
[PB82-145426] N82-28435

Process for recovering chromium and other metals from superalloy scrap
[PB82-145418] N82-28436

Electrolytic method for recovery of lead from scrap batteries
[PB82-141045] N82-28437

In-situ coal gasification of bituminous coals. A development plan
[DE82-002558] N82-28471

MATHEMATICAL MODELS

Six-degree-of-freedom (6-DOF) simulator for weapon testing
[AD-A113536] N82-28308

Preliminary sizing of vibration absorber for space mast structures
[NASA-TM-84488] N82-28346

Two-dimensional hybrid modelling of soil-structure interaction
[PB82-142118] N82-28489

Model of direct initiation of unconfined detonations
[AD-A107446] N82-28508

Methodology for the description and validation of communication protocols --- mathematical models
[FUB-31-1981] N82-28534

An integrated communications demand model
[PB82-141292] N82-28539

Numerical algorithm for rapid integration of turbulence-model equations on elliptic regions
[AD-A113013] N82-28583

Heat pump operating with a mixture of fluids
[PB82-143611] N82-28602

Reliability model for planetary gear
[NASA-TM-82859] N82-28643

A Rand note: Policy analysis of water management for the Netherlands. Volume 18: Sedimentation and dredging cost models
[RAND/N-1500/18-NETH] N82-28694

Modeling misregistration and related effects on multispectral classification N82-28733

Current status of metric reduction of (passive) scanner data N82-28739

Integration of processes for wastewater residuals management
[PB82-147992] N82-28854

Geochemical and geophysical models of the fossile-fuel CO2 climate problem
[DE82-005484] N82-28917

Program maintenance manual polar ice forecast subsystem: Arctic
[AD-A114343] N82-28933

On models and methods for performance measurement
[AD-A113578] N82-28998

Algorithms for autonomous star identification
[NASA-TM-84789] N82-29031

Mathematical specifications of the Onboard Navigation Package (ONPAC) simulator (revision 1)
[NASA-TM-84797] N82-29033

Decentralized resource management in distributed computer systems
[AD-A113255] N82-29069

Some new multivariate distributions with enhanced comparisons via contour and three dimensional plots
[LA-8903-MS] N82-29071

Fitting a polynomial to data in the presence of noise
[AD-A112984] N82-29081

OTT: A computer aided ground wave model for the VHF range in hilly terrain with varying ground characteristics
[FOA-C-30265-E2] N82-29088

Finite birth-and-death models in randomly changing environments
[AD-A114188] N82-29102

Industrial machinery noise impact modeling, volume 1
[PB82-148099] N82-29121

Industrial machinery noise impact modelling. Volume 2: Appendices
[PB82-148107] N82-29122

Analysis of a rail gun plasma accelerator
[AD-A114043] N82-29125

MATRICES (MATHEMATICS)

Implementation of the Gibbs-Poole-Stockmeyer algorithm and the Gibbs-King algorithm
[AD-A113104] N82-29078

Error propagation in stiff differential systems of singular perturbation type
[TRITA-NA-8108] N82-29091

MATRIX MATERIALS

Properties of organic matrix short fiber composites
[AD-A113606] N82-28358

MAXIMUM LIKELIHOOD ESTIMATES

Maximum likelihood spectral estimation and its application of narrowband speech coding
[AD-A114070] N82-28513

Fitting a polynomial to data in the presence of noise
[AD-A112984] N82-29081

MEAN

Laser anemometer using a Fabry-Perot interferometer for measuring mean velocity and turbulence intensity along the optical axis in turbomachinery
[NASA-TM-82841] N82-28605

MECHANICAL DEVICES

The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476

Seismic analysis of rotating mechanical systems. A review N82-28479

MECHANICAL PROPERTIES

The influence of solution treatment time and quench rate on microstructure and mechanical properties of high magnesium aluminum magnesium alloys
[AD-A113826] N82-28413

Studies of the dynamic and mechanical properties of thermoplastics by the split Hopkinson pressure bar method
[PH-130] N82-28443

Threshold tear strength of elastomers
[AD-A114239] N82-28452

Investigation of the long term behavior of heat pipes
[IKE-5-215] N82-28597

Fossil energy program
[DE82-005947] N82-28824

MECHANICAL SHOCK

The shock and vibration digest, volume 14, no. 5
[AD-A115091] N82-28659

MEDICAL EQUIPMENT

USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977

Microelectronic electrode probe for testing brain electrical activity N82-28982

MELTING

Thermal properties of metallic sodium near melt from molecular dynamics calculations
[DE81-030307] N82-29132

MEMBRANES

Method for the preparation of thin-skinned asymmetric reverse osmosis membranes and products thereof
[NASA-CASE-ARC-11359-1] N82-28444

MENTAL PERFORMANCE

Task analysis and the ability requirements of tasks: Collected papers
[AD-A111181] N82-29000

MERCATOR PROJECTION

Map projections for larger-scale mapping N82-28722

MERCURY (METAL)

The application of a bubbling mercury electrode to anodic stripping voltammetry. Determination of zinc, cadium, lead and copper in natural water and industrial waste
[DRIC-T-6565] N82-28791

MESOSCALE PHENOMENA

MIZEX. A program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 1: Research strategy
[AD-A107046] N82-28740

MESSAGE PROCESSING

A class of efficient contention resolution algorithms for multiple access channels --- discrete time multiaccess
[AD-A113840] N82-28512

METAL AIR BATTERIES

Rapidly-refuelable 167-CM(2) aluminum-air power cell
[DE82-006251] N82-28826

METAL COATINGS

A study of the breakdown mechanism of AISI 304 stainless steel, type 2024 aluminum and various titanium coatings
[AD-A113831] N82-28414

METAL FATIGUE

Fatigue properties of quatough steels Fe/4Cr/XMn/0.25C
[DE82-005140] N82-28421

Fatigue crack propagation thresholds for long and short cracks in Rene 95 nickel-base superalloy
[DE82-005135] N82-28422

Influences of gaseous environment on low growth-rate fatigue crack propagation in steels
[DE82-005134] N82-28423

METAL FIBERS

Constitutive relations of randomly oriented steel fiber reinforced concrete under multiaxial compressive loadings
[AD-A114168] N82-28678

METAL HALIDES

High power metallic halide laser --- amplifying a copper chloride laser
[NASA-CASE-NPO-14782-1] N82-28616

METAL MATRIX COMPOSITES

Elevated temperature behavior of metal-matrix composites
[AD-A113128] N82-28359

METAL OXIDE SEMICONDUCTORS

Innovative measurement technology for the semiconductor device industry based on electron spectroscopy
[PB82-135922] N82-28615

Study of the physics of insulating films as related to the reliability of metal oxide semiconductor (MOS) devices
[AD-A112501] N82-29201

Development of a surface technology for GaAs devices
[AD-A112913] N82-29206

METAL PLATES

Acoustic emission monitoring of production armor plate welds
[AD-A114419] N82-28650

METAL POWDER

Sinterable powders from laser driven reactions
[AD-A114062] N82-28628

METAL SURFACES

Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364

Erosion mechanisms of metals
[AD-A111537] N82-28418

Use of metallurgical variables and surface properties to control hydrogen embrittlement
[AD-A114190] N82-28420

METAL VAPOR LASERS

High power metallic halide laser --- amplifying a copper chloride laser
[NASA-CASE-NPO-14782-1] N82-28616

METALLIC GLASSES

Use of metallic glasses in magnetic switching
[DE82-006736] N82-28456

METALLIZING

Evaluation of thick-file inks for solar cell grid metallization
[DE82-005615] N82-28814

METALS

Secondary electron yields of carbon-coated and polished stainless steel
[DE82-012762] N82-28426

Evaluation of potential processes for recovery of metals from coal ash. Volume 2: Laboratory data and cost estimates
[DE82-005592] N82-28428

Steam reforming of n-hexane on pellet and monolithic catalyst beds. A comparative study on improvements due to heat transfer N82-28789

METEOROLOGICAL INSTRUMENTS

A design study for a meteorological instrumentation system for an Omega tower
[AD-A112868] N82-28906

METEOROLOGICAL PARAMETERS

Data registration and integration requirements for severe storms research N82-28711

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Kansas City IAP, Missouri. Parts A-F
[AD-A113179] N82-28895
Bulletin of hydrological and meteorological Service, selected articles
[AD-A114382] N82-28910
Program maintenance manual polar ice forecast subsystem: Arctic
[AD-A114343] N82-28933

METEOROLOGY
Modeling temperature data: An illustration of the use of biplots and bimodels in nonlinear modeling
[AD-A114169] N82-28907
Circulation statics for the extratropical Northern Hemisphere based on NMC analyses
[PB82-158759] N82-28925
Operations of the National Weather Service
[PB82-161829] N82-28927

METHYL ALCOHOLS
Fire extinguishing tests -80 with methyl alcohol gasoline
[SP-RAPP-1981:20] N82-28485

METHYLENE
Studies in chemical reactivity
[DE82-006891] N82-28407

MICHELSON INTERFEROMETERS
A Fourier transform spectrometer for visible and near ultra-violet measurements of atmospheric absorption
[NASA-TM-73297] N82-28606

MICROBALLOONS
Method of forming frozen spheres in a force-free drop tower
[NASA-CASE-NPO-14845-1] N82-28442

MICROCOMPUTERS
The design, development and application of advanced video and microcomputer-based command and control (C2) systems
[AD-A113742] N82-28511
Automated torsion pendulum: Control and data collection/reduction using a desktop computer
[AD-A113036] N82-28670

MICROELECTRONICS
Technical guidelines for LSI hybrid microcircuits
[AD-A114437] N82-28562
Solid state research
[AD-A114189] N82-29209

MICROORGANISMS
Apparatus and process for microbial detection and enumeration
[NASA-CASE-LAR-12709-1] N82-28604
Marine sciences group
[DE82-005145] N82-28940
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Microorganisms used to monitor environmental pollution N82-28978

MICROPROCESSORS
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114426] N82-28294
Tent shaped phased array rests
[AD-A113191] N82-28516
Numerical algorithm for rapid integration of turbulence-model equations on elliptic regions
[AD-A113013] N82-28583
System description of the IMP-16C microprocessor orbit determination program
[NASA-TM-84802] N82-29023
Evaluation of the IMP-16 microprocessor orbit determination system filter
[NASA-TM-84788] N82-29026
Orbit determination software development for microprocessor based systems: Evaluation and recommendations
[NASA-TM-84794] N82-29028
Preliminary Automated Orbit Determination System (AODS)/AODS environment simulator for prototype testing (ADEPT) user's guide
[NASA-TM-84798] N82-29036

MICROSTRIP TRANSMISSION LINES
Dual polarization N82-28338

MICROSTRUCTURE
Materials research for advanced inertial instrumentation. Task 1: Dimensional stability of gyroscope structural materials
[AD-A113497] N82-28273
Effects of cobalt on the microstructure of Udimet 700
[NASA-CR-165605] N82-28409
The influence of solution treatment time and quench rate on microstructure and mechanical properties of high magnesium aluminum magnesium alloys
[AD-A113826] N82-28413
On microstructural control of near threshold fatigue crack growth in 7000 series aluminum alloys
[AD-A113486] N82-28417
Investigation of corrosion and microstructural properties of high strength aluminum alloys after Jominy testing
[NLR-MP-81004-U] N82-28432
The Jominy end-quench test for investigation of corrosion properties and microstructure of high strength aluminum alloys
[NLR-TR-80102-U] N82-28434
Processing and properties of Zn0 based varistors
[DE82-005583] N82-28565
A first report on welding diagrams
[PB82-134602] N82-28653
Investigation of the tensile deformation and fracture of dual-phase steel
[DE82-007522] N82-28682

MICROWAVE CIRCUITS
Computer-assisted circuit design masks for the production of microwave circuits
[PB82-140153] N82-28494
Microwave circuit analysis and synthesis
[AD-A113560] N82-28554

MICROWAVE EMISSION
A broadband waveguide transfer standard for the dissemination of UK national microwave power standards
[RSRE-MEMO-3390] N82-28498

MICROWAVE FILTERS
Electronically tunable amplifier technology
[AD-A113193] N82-28555

MICROWAVE FREQUENCIES
NORSEX: Total and multiyear ice concentration at Svalbard in September and October 1979, mapped by satellite microwave sensor at frequencies 37 GHz and 10 GHz
[PB82-160029] N82-28775

MICROWAVE LANDING SYSTEMS
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
[NASA-CR-3574-PT-4] N82-28269

MICROWAVE RADIOMETERS
Improved 35 GHz radiometer for solar burst measurements
[AD-A113139] N82-29256

MICROWAVE SENSORS
Sensor technology
[FOA-C-30262-E1] N82-28613
NORSEX: Total and multiyear ice concentration at Svalbard in September and October 1979, mapped by satellite microwave sensor at frequencies 37 GHz and 10 GHz
[PB82-160029] N82-28775

MICROWAVES
Structural and electronic studies of defects in amorphous silicon
[DE82-004477] N82-29213

MIDAIR COLLISIONS
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43)
[B-206064] N82-28264

MILITARY AIRCRAFT
Historical research and development inflation indices for Army fixed and rotor winged aircraft
[AD-A114368] N82-28290

MILITARY TECHNOLOGY
Evaluation of requirements for militarization of 3 kW free piston Stirling engine generator sets
[AD-A113409] N82-28648
United States Air Force Summer Faculty Research Program. 1981 Program Management report
[AD-A113707] N82-29259

MILKY WAY GALAXY
Neutral interstellar gas in the lower galactic halo N82-29246

MILLIMETER WAVES
Integrated balanced FETS for broadband millimeter wave amplifiers
[AD-A107526] N82-28551

MINERAL DEPOSITS
Cobalt availability-domestic: A minerals availability system appraisal
[PB82-135435] N82-28438
Hydrogeochemical and stream sediment reconnaissance basic data for Ophir, Alaska
[DE82-000851] N82-28753
Hydrogeochemical and stream sediment reconnaissance basic data for Cheyenne quadrangle, Wyoming
[DE82-000786] N82-28754
Hydrogeochemical and stream sediment reconnaissance basic data for Preston quadrangle, Wyoming; Idaho
[DE82-000783] N82-28755
Hydrogeochemical and stream sediment reconnaissance basic data for Aztec Qaudrangle, New Mexico
[DE82-000853] N82-28760
Manganese nodule resource data, Sea Scope expedition
[PB82-142571] N82-28768

MINERAL EXPLORATION
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 1
[DE82-005544] N82-28744
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745
Airborne gamma-ray spectrometer and magnetometer survey, New Rockford quadrangle, North Dakota
[DE82-005535] N82-28746
Airborne gamma-ray spectrometer and magnetometer survey: New Rockford quadrangle, North Dakota, Volume 2
[DE82-005569] N82-28747
Airborne gamma-ray spectrometer and magnetometer survey: Crescent quadrangle, Burns quadrangle, Canyon City quadrangle, Bend quadrangle, Salem quadrangle (Oregon)
[DE81-029063] N82-28749
Airborne gamma-ray spectrometer and magnetometer survey Coos Bay, Oregon, volume 1
[DE82-005534] N82-28750
Hydrogeochemical and stream sediment reconnaissance basic data for Silver City quadrangle, New Mexico; Arizona
[DE82-000852] N82-28761
Hydrogeochemical and stream sediment reconnaissance basic data for Dallas NTMS quadrangle, Texas
[DE82-000856] N82-28763
Airborne gamma-ray spectrometer and magnetometer survey, Roseburg Quadrangle, Oregon, volume 1
[DE82-005536] N82-28765

MINERAL METABOLISM
Osteoporosis in unsupported extremities N82-28970

MINERALOGY
Nevada nuclear waste storage investigations
[DE82-004722] N82-29150

MINES (EXCAVATIONS)
The effects of lease size on yields from oil shale surface mines
[RAND/N-1798-DOE] N82-28697
Requirements for the conceptual design of advanced underground coal extraction systems
[NASA-CR-169142] N82-28790

MINIATURE ELECTRONIC EQUIPMENT
Cost effective communication with the electronic, microprocessor-controlled SPC telephone system EMS
[MBB-512-82-O] N82-28536
Advanced electronic technology
[AD-A114319] N82-28563
Future computing
[RAND/P-6680] N82-29020

MINIATURIZATION
Miniature interferometer transducer: An optical system description and cost analysis
[DE82-004653] N82-29168

MINIMAX TECHNIQUE
The best parameter subset using the Chebychev curve fitting criterion
[AD-A114327] N82-29083
MINING
Bureau of Mines research 1981: A summary of significant results in mineral technology and economics
[PB82-159971] N82-28776
Requirements for the conceptual design of advanced underground coal extraction systems
[NASA-CR-169142] N82-28790
MIRROR FUSION
Mirror fusion test facility status
[DE82-006187] N82-29185
MIRRORS
Ultra-lightweight mirror manufacturing and radiation response study
[AD-A106998] N82-29157
MISSILE ANTENNAS
Flight termination system equipment. Volume 1: Antennas and antenna couplers
[AD-A113493] N82-28320
MISSILE CONTROL
The use of a deflectable nose on a missile as a control device
[AD-A112179] N82-28319
MISSILE DESIGN
Computational aerodynamics at Weapons Systems Research Laboratory
[AD-A112867] N82-28257
MISSILE TRACKING
Optimal alpha-beta filtering for tracking reentry vehicles from shipboard radars
[AD-A113076] N82-28314
MISSION PLANNING
Autonomous scheduling technology for Earth orbital missions
[NASA-CR-168939] N82-29217
MISSOURI
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Kansas City IAP, Missouri. Parts A-F
[AD-A113179] N82-28895
MITOSIS
Mitotic activity and volume of epithelial cell nuclei of rat cornea following spaceflights in biosatellites N82-28965
MIXING CIRCUITS
Acoustooptic time-integrating correlators and optoelectronic mixers
[AD-A114149] N82-28548
MODCOMP IV COMPUTER
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) MODCOMP device and MAX 4 dependency study
[NASA-TM-84796] N82-29027
MODELS
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901280] N82-29106
MODES
Instantons in the quark plasma. The role of Fermion zero modes
[REPT-677] N82-29174
MODULATION
Reduction of spectral interferences in inductively coupled plasma-atomic emission spectrometry by selective spectral-line modulation
[AD-A112886] N82-29178
MOISTURE
The effects of moisture on mountain lee waves
[PB82-156621] N82-28920
MOLDS
Computer-aided injection molding system
[PB82-147810] N82-28490
MOLECULAR CLOUDS
Determination of the intrinsic Q(3)/5(1) line intensity ratio of molecular hydrogen
[ATR-82(8415)-1] N82-29247
MOLECULAR COLLISIONS
Molecular reaction rates
[AD-A114342] N82-29130
MOLECULAR EXCITATION
Molecular reaction rates
[AD-A114342] N82-29130
MOLECULAR INTERACTIONS
Dimensions/NBS, volume 65, number 7, September 1961
[PB82-158692] N82-29230
MOLECULAR ORBITALS
An SCF-X alpha-SW molecular-orbital study of a possible reaction path for Ziegler-Natta catalysts
[AD-A113559] N82-28373
MOLECULAR RELAXATION
Studies of the dynamic and mechanical properties of thermoplastics by the split Hopkinson pressure bar method
[PH-130] N82-28443
Endor studies of radiation-produced trapped electrons and radicals in disordered systems and radical matrix interactions in polymers and on surfaces
[AD-A114321] N82-28455
Energy paths in chemical reactions
[AD-A114191] N82-28609
MOLECULAR ROTATION
Rotational analysis of the red system of C-13N-14. Part 2: Wave numbers, term values and constants
[USIP-81-11] N82-29258
MOLECULAR SPECTROSCOPY
Activities report of the Institute for Extraterrestrial Physics
[MPI-PAE/EXTRATERR-172] N82-29245
MOLECULAR STRUCTURE
The use of a perfectly conducting sphere to excite the plasmon of a flat surface. 1: Calculation of the local field with applications to surface enhanced spectroscopy
[AD-A114278] N82-28384
Reduction of carbon monoxide. Past research summary
[DE82-007524] N82-28405
Determination of the effect of composition, structure and electrochemical mass transport properties on adhesion and corrosion inhibition of paint films
[AD-A113975] N82-28448
Chemical design of elastomeric behavior
[AD-A114335] N82-28454
Chemical structure by laser-produced X-rays
[AD-A113864] N82-28627
NMR studies of oriented molecules
[DE82-005258] N82-29134
Study of correlations in molecular motion by multiple quantum NMR
[DE82-005650] N82-29144
Structuring caused by Rayleigh-Taylor instability
[AD-A114085] N82-29181
Properties of three-dimensional energetic solids and molecular crystals
[AD-A113764] N82-29205
Crystal and molecular structures of selected organic and organometallic compounds and an algorithm for empirical absorption correction
[DE82-005451] N82-29210
MOLECULAR WEIGHT
Enhancement of the stability of common polymeric materials against undersea degradation
[PB82-163015] N82-28458
MOLTEN SALTS
Evaluation of nonelectrical energy-transmission options
[DE82-000886] N82-28821
MOLYBDENUM
Molybdenum and its analyses
[DE82-007645] N82-28430
MOMENTUM
Entrainment modelling of buoyant momentum jets in water
[AD-A112797] N82-28580
MONSOONS
Summer MONEX US research flight missions, May - July 1979
[PB82-158718] N82-28923
Winter MONEX US research flight missions, December 1978
[PB82-158767] N82-28929
MONTE CARLO METHOD
Monte Carlo calculations of two-dimensional combustor flows
[AD-A113780] N82-28374
MOTION SICKNESS
Reaction to diminished circulating blood volume in individuals who are susceptible and insusceptible to motion sickness (seasickness) N82-28960
MOTION SICKNESS DRUGS
Efficacy of kavinton in prevention of motion sickness N82-28961
MOTIVATION
Adapative motivation theory
[AD-A111195] N82-28997
MOUNTAINS
Flight evaluation of LORAN-C in the State of Vermont
[NASA-TM-84711] N82-28278
The effects of moisture on mountain lee waves
[PB82-156621] N82-28920
MSAT
MSAT design N82-28328
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report
[NASA-CR-169136] N82-28330
Satellite system design N82-28333
The technology N82-28335
Cassegrain dual reflector antenna design --- MSAT UHF antenna N82-28336
Dual-shaped reflector design N82-28337
Dual polarization N82-28338
Intermodulation analysis --- MSAT antenna N82-28339
Multiple beam offset antenna design processes --- MSAT antenna N82-28340
Electric propulsion --- pulsed plasma thruster and electron bombardment ion engine for MSAT attitude control and stationkeeping N82-28341
MULTILAYER INSULATION
Radon diffusion through multilayer earthen covers: Models and simulations
[DE82-001420] N82-29138
MULTIMISSION MODULAR SPACECRAFT
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) MODCOMP device and MAX 4 dependency study
[NASA-TM-84796] N82-29027
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) state-of-the-art computer systems/ compatibility study
[NASA-TM-84792] N82-29042
MULTIPATH TRANSMISSION
Multipath analysis of telemetry support positions for APATS
[AD-A114057] N82-28342
MULTIPLE ACCESS
A class of efficient contention resolution algorithms for multiple access channels --- discrete time multiaccess
[AD-A113840] N82-28512
MULTIPLE BEAM INTERVAL SCANNERS
MLA imaging systems N82-28716
MULTIPLEXING
Availability analysis of a multiplex system
[FUB-30-1981] N82-28533
MULTIPROCESSING (COMPUTERS)
ADA on multiple processors
[RSRE-MEMO-3464] N82-29019
MULTISPECTRAL BAND SCANNERS
Current status of metric reduction of (passive) scanner data N82-28739
MULTISPECTRAL LINEAR ARRAYS
An automated mapping satellite system N82-28734
MULTIVARIATE STATISTICAL ANALYSIS
Modeling temperature data: An illustration of the use of biplots and bimodels in nonlinear modeling
[AD-A114169] N82-28907
Some new multivariate distributions with enhanced comparisons via contour and three dimensional plots
[LA-8903-MS] N82-29071
Multivariate analysis and its applications
[AD-A113027] N82-29077
Multi-sample cluster analysis with varying parameters using Alkaike's information criterion
[AD-A113422] N82-29080
MUSCLES
Testosterone enhances C-14 2-deoxyglucose uptake by striated muscle --- sex hormones and muscle
[NASA-CR-169101] N82-28986
MUSCULAR FUNCTION
Condition of rats connective tissue during long-term hypokinesia and in recovery period N82-28969
MUSCULOSKELETAL SYSTEM
Effect of high ambient temperature on carbohydrate metabolism in rat liver and skeletal muscles N82-28975

MYOCARDIUM
Catecholamines and enzymes of their metabolism in rat myocardium after flight aboard the Cosmos-936 biosatellite N82-28966

N

NARCOSIS
Possible impairment of respiratory regulation under hyperbaric nitrogen narcosis N82-28964
NASA PROGRAMS
NASA authorization for fiscal year 1983
[GPO-91-557] N82-29233
NATURAL GAS
Effect of outside combustion air on gas furnace efficiency
[AD-A113484] N82-28377
NAVIER-STOKES EQUATION
Numerical algorithm for rapid integration of turbulence-model equations on elliptic regions
[AD-A113013] N82-28583
Computation of laminar and turbulent flow in 90 deg square duct and pipe bends using the Navier-Stokes equations
[AD-A114258] N82-28589
Solving the Navier-Stokes equations with LSODI and the method of lines
[DE82-006179] N82-28594
NAVIGATION AIDS
General aviation activity and avionics survey
[AD-A112924] N82-28244
Aids to navigation principal findings on the CAORF experiment. The performance of visual aids to navigation as evaluated by simulation
[AD-A107045] N82-28271
Flight evaluation of LORAN-C in the State of Vermont
[NASA-TM-84711] N82-28278
NAVSTAR SATELLITES
Navstar/Global Positioning System N82-28719
NEAR FIELDS
Two-dimensional hybrid modelling of soil-structure interaction
[PB82-142118] N82-28489
Near field antenna measurement system
[AD-A114125] N82-28522
Measurement of sound power flow in bending waves along pipes. Part 2: Influence of a near field on measurements with two accelerometers
[TPD-008-785/1] N82-29117
NEAR ULTRAVIOLET RADIATION
A Fourier transform spectrometer for visible and near ultra-violet measurements of atmospheric absorption
[NASA-TM-73297] N82-28606
NEODYMIUM LASERS
Fluorescent glasses for use in fluorescently pumping Nd-3(+) doped laser glass
[AD-A107503] N82-28620
The choice of a laser for airborne depth sounding
[AD-A112901] N82-28629
Evaluation of the performance of a laser for airborne depth sounding
[AD-A112907] N82-28630
Internal heat deposition in laser highly accelerated targets
[AD-A114206] N82-28639
Laser hydrography in Australia
[AD-A113584] N82-28741
NETHERLANDS
A Rand note: Policy analysis of water management for the Netherlands. Volume 3: Screening of eutrophication control tactics
[RAND/N-1500/3-NETH] N82-28691
A Rand note: Policy analysis of water management for the Netherlands. Volume 16: Costs for infrastructure tactics
[RAND/N-1500/16-NETH] N82-28692
A Rand note: Policy analysis of water management for the Netherlands. Volume 17: Flood safety model for the Ijssel Lakes --- dike safety
[RAND/N-1500/17-NETH] N82-28693
A Rand note: Policy analysis of water management for the Netherlands. Volume 18: Sedimentation and dredging cost models
[RAND/N-1500/18-NETH] N82-28694
NETWORK ANALYSIS
Methodology for the description and validation of communication protocols --- mathematical models
[FUB-31-1981] N82-28534
Geodetic control N82-28720
Least squares adjustment of large-scale geodetic networks by orthogonal decomposition
[DE82-002253] N82-28758
Research program in fully distributed processing systems
[AD-A114199] N82-29018
NEUTRAL BEAMS
RF plasma sources for neutral-beam-injection systems. Phase 1: Definition study
[DE82-004193] N82-29182
NEUTRINOS
Lifetimes and production properties of charmed particles
[DE82-005302] N82-29140
NEUTRON BEAMS
Charged particle simulation of fast neutron damage
[AD-A107394] N82-29124
NEUTRON COUNTERS
Dimensions/NBS, volume 65, number 7, September 1981
[PB82-158692] N82-29230
NEUTRON FLUX DENSITY
Photoneutron generation with electron undulators
[DE82-007034] N82-29142
NEUTRON IRRADIATION
Impact of a proposed change in the maximum permissible dose limit for neutrons to radiation-protection programs at DOE facilities
[DE82-001419] N82-29137
NEVADA
Interpretation of time-domain electromagnetic soundings in the Calico Hills area, Nevada Test Site, Nye County, Nevada
[DE82-004260] N82-28869
Nevada nuclear waste storage investigations
[DE82-005879] N82-29149
Nevada nuclear waste storage investigations
[DE82-004722] N82-29150
NEW MEXICO
Hydrogeochemical and stream sediment reconnaissance basic data for Silver City quadrangle, New Mexico; Arizona
[DE82-000852] N82-28761
Elastomechanical methods in the exploration of the Valles Caldera, New Mexico
[DE82-006923] N82-28766
NEW YORK
Ethanol production in Suffolk County, New York: Technical and economic feasibility
[PB82-145152] N82-28475
NEW ZEALAND
Standard weather data for New Zealand
[DE82-901427] N82-28912
NICKEL
Steam reforming of n-hexane on pellet and monolithic catalyst beds. A comparative study on improvements due to heat transfer N82-28789
NICKEL ALLOYS
Effects of cobalt on the microstructure of Udimet 700
[NASA-CR-165605] N82-28409
In-bed corrosion tests of superheater alloys in a 10-square-foot AFBC
[DE82-901346] N82-28427
Stress corrosion cracking of alloy 600
[DE82-901313] N82-28429
Process for recovering chromium and other metals from superalloy scrap
[PB82-145418] N82-28436
NICKEL CADMIUM BATTERIES
A pyrometallurgical method for processing Ni-Cd scrap batteries
[PB82-145426] N82-28435
NIGHT VISION
Night vision and electro-optics technology transfer, 1972 - 1981
[AD-A114134] N82-29167
NIOBIUM ALLOYS
Proximity effect in Cu-NbSn composites
[DE82-005449] N82-28361
Thermotransport of hydrogen and deuterium in vanadium, niobium and tantalum alloys
[DE82-005453] N82-28424
NITROGEN COMPOUNDS
Inorganic halogen oxidizer research
[AD-A114196] N82-28382
Nitrogen compound levels in tissues of rat cerebral hemispheres and cerebellum after flight aboard Cosmos-1129 biosatellite N82-28967
NITROGEN FLUORIDES
Laser-induced reactions of nitrogen fluorides with nitrogen oxides
[AD-A113667] N82-28626
NITROGEN ISOTOPES
Rotational analysis of the red system of C-13N-14. Part 2: Wave numbers, term values and constants
[USIP-81-11] N82-29258
NITROGEN METABOLISM
Nitrogen compound levels in tissues of rat cerebral hemispheres and cerebellum after flight aboard Cosmos-1129 biosatellite N82-28967
NITROGEN OXIDES
Laser-induced reactions of nitrogen fluorides with nitrogen oxides
[AD-A113667] N82-28626
One-and two dimensional photochemical modeling of the chemical interactions in the middle atmosphere (0-120 km)
[PB82-156613] N82-28874
NITROUS OXIDES
Possible impairment of respiratory regulation under hyperbaric nitrogen narcosis N82-28964
NODULES
Manganese nodule resource data, Sea Scope expedition
[PB82-142571] N82-28768
NOISE (SOUND)
Industrial machinery noise impact modeling, volume 1
[PB82-148099] N82-29121
NOISE GENERATORS
An experimental study of travelling-bubble cavitation noise
[AD-A114107] N82-28587
NOISE INTENSITY
Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations
[AD-A113672] N82-28841
NOISE MEASUREMENT
Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations
[AD-A113672] N82-28841
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation
[TPD-908-720] N82-29116
Industrial machinery noise impact modeling, volume 1
[PB82-148099] N82-29121
Industrial machinery noise impact modelling. Volume 2: Appendices
[PB82-148107] N82-29122
NOISE PREDICTION (AIRCRAFT)
Some comments on the prediction of forward flight effects on jet noise
[MPIS-20/1981] N82-29118
NOISE REDUCTION
The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft
[NASA-CR-137803] N82-28281
Static noise tests on modified augmentor wing jet STOL research aircraft
[NASA-TM-81231] N82-28295
An evaluation of strategies to control noise from air conditioning and refrigeration condensing units
[PB82-165903] N82-28496
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111
Calculation procedure for sound propagation in a multisectional duct with uniform flow
[NLR-TR-79111-U] N82-29119
Calculation of sound suppression in a circular three-sectioned uniform flow duct
[NLR-TR-81002-U] N82-29120
Industrial machinery noise impact modeling, volume 1
[PB82-148099] N82-29121
NOISE SPECTRA
Fitting a polynomial to data in the presence of noise
[AD-A112984] N82-29081

NONAQUEOUS ELECTROLYTES
Electrochemistry of sulfur dioxide in nonaqueous solutions, part 1
[AD-A113033] N82-28379
NONDESTRUCTIVE TESTS
Acoustic emission monitoring of production armor plate welds
[AD-A114419] N82-28650
Trend inspection station for printed circuit board soler joints, ultrasonic subsystem
[AD-A112918] N82-28655
Quality control and nondestructive evaluation techniques for composites. Part 7: Thermography: A state-of-the-art review
[AD-A114392]. N82-28657
Applied stress determination using computerized ultrasonic techniques
[DE82-003894] N82-28681
Fundamental developments for quantitative acoustic emission measurements
[DE82-901315] N82-29114
NONEQUILIBRIUM FLOW
Acoustic instabilities as a source of turbulence in reduced density channels
[AD-A114275] N82-28592
NONLINEAR EQUATIONS
Electrodynamics: A consequence of nonlinear realizations of the Lorentz group
[DE82-004775] N82-28531
NONLINEAR OPTICS
Compliant surfaces
[AD-A114309] N82-29166
NONLINEAR SYSTEMS
The determination of gust loads on nonlinear aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28303
Nonlinear system identification technique validation
[AD-A112593] N82-28505
A design methodology for nonlinear systems containing parameter uncertainty: Application to nonlinear controller design
[NASA-CR-166358] N82-29005
NONLINEARITY
On the nonlinear conductivity tensor for an unmagnetized relativistic turbulent plasma
[AD-A113699] N82-29176
NONPARAMETRIC STATISTICS
Nonparametric estimation of signals mixed with noise
[AD-A113018] N82-28514
Bias reduction
[AD-A114254] N82-29100
NONRELATIVISTIC MECHANICS
Nonrelativistic gauge theories
[DE81-700397] N82-29110
NORTH DAKOTA
Airborne gamma-ray spectrometer and magnetometer survey, New Rockford quadrangle, North Dakota
[DE82-005535] N82-28746
Airborne gamma-ray spectrometer and magnetometer survey: New Rockford quadrangle, North Dakota, Volume 2
[DE82-005569] N82-28747
NOSE CONES
Study of boundary-layer transition using transonic cone Preston tube data
[NASA-CR-169130] N82-28579
NOTCH STRENGTH
Research study to define the critical failure mechanisms in notched composites under compression fatigue loading
[AD-A113654] N82-28356
NOTCHES
Damage development mechanisms in notched graphite epoxy composite laminates during compressive fatigue loading
[PB82-142316] N82-28367
NOZZLE GEOMETRY
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249
NUCLEAR CHEMISTRY
Experimental nuclear and radiochemistry
[DE82-002925] N82-28402
NUCLEAR EXPLOSION EFFECT
Identification of requirements for atmospheric data --- to determine nuclear explosion effects on weapon systems
[AD-A113640] N82-28886
NUCLEAR FUEL REPROCESSING
Tokamaks with high-performance resistive magnets: Advanced test reactors and prospects for commercial applications
[DE82-007366] N82-29188
NUCLEAR FUELS
Interpretation of time-domain electromagnetic soundings in the Calico Hills area, Nevada Test Site, Nye County, Nevada
[DE82-004260] N82-28869
US Geological Survey research in radioactive waste disposal, fiscal year 1979
[USGS-CIRC-847] N82-29145
Tokamaks with high-performance resistive magnets: Advanced test reactors and prospects for commercial applications
[DE82-007366] N82-29188
NUCLEAR FUSION
Plasma assessments for the Fusion Engineering Device (FED)
[DE82-004649] N82-29184
NUCLEAR MAGNETIC RESONANCE
Study of hydrogen in coals, polymers, oxides, and muscle water by nuclear magnetic resonance: Extension of solid state high resolution techniques
[DE82-005454] N82-28395
NMR studies of oriented molecules
[DE82-005258] N82-29134
Study of correlations in molecular motion by multiple quantum NMR
[DE82-005650] N82-29144
NUCLEAR PHYSICS
Proceedings of the 1980 CERN School of Computing
[CERN-81-03] N82-29017
NUCLEATION
Quantitative thermal desorption spectrometry of noble gases in solids N82-28369
Non-destructive evaluation of defects in structural materials using long-wavelength neutrons
[AD-A113500] N82-28656
Simplified free-energy calculation for ion-induced heteromolecular nucleation
[NASA-TP-2039] N82-28839
NUMBER THEORY
Fundamentals of number theory and polynominals algebra for numerical signal processing
[FUB-27-1981] N82-29087
NUMERICAL ANALYSIS
Ocean altimetry algorithms status: March 1982
[AD-A114325] N82-28935
NUMERICAL CONTROL
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284
Design and validation of a thermal simulator for solar system performance testing
[DE82-005589] N82-28803
Reconfiguring redundancy management
[NASA-CASE-MSC-18498-1] N82-29013
NUMERICAL FLOW VISUALIZATION
A numerical investigation of the dynamics of liquid spray
[AD-A113378] N82-28586
NUMERICAL INTEGRATION
A numerical method for analytic continuation of conformal mappings
[TRITA-NA-8118] N82-29089
NUMERICAL STABILITY
Multiple step G-contractivity with applications to slowly varying linear systems
[TRITA-NA-8107] N82-29092
On the contractivity region of Runge-Kutta methods
[TRITA-NA-8106] N82-29093
NUMERICAL WEATHER FORECASTING
Time scales of systematic errors in a numerical weather forecast
[AD-A113374] N82-28888
Standard weather data for New Zealand
[DE82-901427] N82-28912
NUTRITION
Evaluation of engineering foods for Controlled Ecological Life Support Systems (CELSS)
[NASA-CR-166359] N82-29006
NUTRITIONAL REQUIREMENTS
USSR report. Space biology and aerospace medicine, volume 16, no. 3, May - June 1982
[JPRS-81197] N82-28949
Metabolic distinctions related to intake of low-calorie 'survival' rations consisting only of readily assimilated carbohydrates N82-28953
NYSTAGMUS
Nystagmometry of optovestibular interaction N82-28962
A procedure for the analysis of nystagmus and other eye movements
[AD-A112603] N82-28987

O

OCCUPATION
Empirical comparison of binary and continuous proximity measures for clustering occupational task data
[AD-A112930] N82-29097
OCEAN BOTTOM
An experimental computer algorithm for seamount model parameter estimation based on SEASAT-A satellite radar altimetry
[AD-A113169] N82-28743
Manganese nodule resource data, Sea Scope expedition
[PB82-142571] N82-28768
Ocean current effects on marine seismic systems and deployments
[AD-A114135] N82-28934
Geology related to acoustic transmission: Eastern Caribbean
[AD-A114430] N82-28938
OCEAN CURRENTS
Method and apparatus for Delta K synthetic aperature radar measurement of ocean current
[NASA-CASE-NPO-15704-1] N82-28502
Scientific opportunities using satellite wind stress measurements over the ocean
[NASA-CR-169100] N82-28879
Pacific area current charts
[AD-A112293] N82-28930
Ocean current effects on marine seismic systems and deployments
[AD-A114135] N82-28934
Radioelement studies in the oceans
[DE82-003705] N82-28942
Vertical sections of temperature, salinity, thermosteric anomaly and zonal geostrophic velocity from NORPAX shuttle experiment, part 1
[PB82-163106] N82-28944
OCEAN MODELS
Geochemical and geophysical models of the fossile-fuel CO2 climate problem
[DE82-005484] N82-28917
The dynamics of mean circulation on the continental shelf
[PB82-157082] N82-28943
Computer support to NORDA codes 520 and 530
[AD-A114371] N82-29052
Variability and sensitivity of coupled mixed layer acoustic model systems
[AD-A114302] N82-29123
OCEAN SURFACE
High-resolution radar sea scatter, experimental observations and discriminants
[AD-A113394] N82-28520
An experimental computer algorithm for seamount model parameter estimation based on SEASAT-A satellite radar altimetry
[AD-A113169] N82-28743
Scientific opportunities using satellite wind stress measurements over the ocean
[NASA-CR-169100] N82-28879
Ocean current effects on marine seismic systems and deployments
[AD-A114135] N82-28934
Surface stress estimation for study of the circulation dynamics of the Gulf of Mexico
[AD-A114349] N82-28936
Measurements of whitecap coverage and surface winds over the Gulf of Mexico loop current
[AD-A114429] N82-28937
OCEAN TEMPERATURE
Environmental satellite imagery, July 1981
[PN82-156894] N82-28922
Vertical sections of temperature, salinity, thermosteric anomaly and zonal geostrophic velocity from NORPAX shuttle experiment, part 1
[PB82-163106] N82-28944

Infrared transmittance of marine atmospheres --- sea surface temperature
[AD-A114414] N82-29164

OCEAN THERMAL ENERGY CONVERSION
Projected engineering cost estimates for an Ocean Thermal Energy Conversion (OTEC)
[RAND/N-1788-RC] N82-28782
Marine sciences group
[DE82-005145] N82-28940
OTEC biofouling, corrosion, and materials study from a moored platform at Punta Tuna, Puerto Rico
[DE82-007037] N82-28947

OCEANOGRAPHIC PARAMETERS
Preliminary results of line sensor test
[AD-A114313] N82-28939

OCEANOGRAPHY
Operations of the National Weather Service
[PB82-161829] N82-28927
Environmental files and data bases. Part A: Introduction and oceanographic management information system
[AD-A113687] N82-29226

OCEANS
Radioelement studies in the oceans
[DE82-003705] N82-28942
Monitoring technologies for ocean disposal of radioactive waste
[RAND/R-2773-NOAA] N82-29146

OGIVES
An investigation of the flow about an ogive cylinder at high angles of incidence
[AD-A113356] N82-28256

OIL EXPLORATION
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689

OIL RECOVERY
Multi-frac test series
[DE82-004514] N82-28680

OILS
Experimental heat transfer coefficients for the cooling of oil in horizontal internal forced convective transitional flow
[PB82-142993] N82-28601

OMEGA NAVIGATION SYSTEM
Evaluation of various navigation system concepts
[AD-A112919] N82-28275
A design study for a meteorological instrumentation system for an Omega tower
[AD-A112868] N82-28906

ONBOARD DATA PROCESSING
Automated Orbit Determination System (AODS) requirements definition and analysis
[NASA-TM-84795] N82-29030
Mathematical specifications of the Onboard Navigation Package (ONPAC) simulator (revision 1)
[NASA-TM-84797] N82-29033
Automated Orbit Determination System (AODS) environment simulator for prototype testing (ADEPT) system description
[NASA-TM-84801] N82-29035
GPSPAC/LANDSAT-D Interface (GLI) system user's guide
[NASA-TM-84784] N82-29038
Autonomous onboard attitude determination system specifications and requirements
[NASA-TM-84800] N82-29056

ONBOARD EQUIPMENT
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552

ONE DIMENSIONAL FLOW
Gas-driven fracture propagation
[DE82-003079] N82-28870

OPERATING SYSTEMS (COMPUTERS)
Research program in fully distributed processing systems
[AD-A114199] N82-29018
Systems Technology Laboratory (STL) compendium of utilities
[NASA-TM-84799] N82-29034
Distributed operating system design study, volume 1
[AD-A113172] N82-29067
Distributed operating system design study, volume 2
[AD-A113173] N82-29068

OPERATIONAL HAZARDS
Laboratory demonstration electromagnetic launcher: Preliminary hazard analysis
[AD-A114154] N82-28524

OPERATIONS RESEARCH
Are robustness measures robust --- quantification and optimization of decision making in solving policy problems
[RAND/P-6734] N82-29073

OPTICAL COMMUNICATION
Fiber optics technological review and assessment for traffic control
[PB82-145616] N82-29173

OPTICAL DATA PROCESSING
Application of phase retrieval
[AD-A113383] N82-29161

OPTICAL EQUIPMENT
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292

OPTICAL MEASUREMENT
Optical and in situ measuring of structure parameters relevant to temperature and humidity and their application to the measuring of sensible and latent heat flux --- atmospheric optics
[AD-A114336] N82-28637

OPTICAL MEASURING INSTRUMENTS
Compliant surfaces
[AD-A114309] N82-29166

OPTICAL PROPERTIES
Thermo-optical properties of optical glasses
[DE82-003681] N82-29169

OPTICAL RADAR
Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking
[NASA-TM-73298] N82-28690
Critical assessment of a series of lidar aerosol measurement results
[DFVLR-FB-82-03] N82-28853

OPTICAL SCANNERS
Spaceborne scanner imaging system errors
N82-28713
Geometric and rediametric distortion in spaceborne SAR imagery N82-28717

OPTICAL TRACKING
Equipment and tracking test results for the NRL ship-to-ship DF laser transmission experiment
[AD-A113485] N82-28631
Attitude tracker N82-28736

OPTICAL WAVEGUIDES
Design and fabrication of multimode optical switches
[AD-A113812] N82-29159
Polarized Quasi-Optical phase shifter
[AD-A114300] N82-29165

OPTIMAL CONTROL
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298
Optimal alpha-beta filtering for tracking reentry vehicles from shipboard radars
[AD-A113076] N82-28314
An intelligent control strategy for computer consultation
[AD-A113388] N82-29016

OPTIMIZATION
Optimization studies of various coal conversion systems
[DE82-005208] N82-28473
The optimal design of involute gear teeth with unequal addenda
[NASA-TM-82866] N82-28645
Data vs. information: A system paradigm
N82-28732
Optimixing synchronous systems
[AD-A113916] N82-29015
ADA on multiple processors
[RSRE-MEMO-3464] N82-29019
Program package for solving linear optimization problems. User's manual
[DE81-700125] N82-29065
Unconstrained minimization by interpolation: Rates of convergence
[AD-A114115] N82-29082
The 10th IFIP Conference on System Modeling and Optimization
[AD-A113126] N82-29104
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901280] N82-29106

ORBIT CALCULATION
System description of the IMP-16C microprocessor orbit determination program
[NASA-TM-84802] N82-29023
LANDSAT/NAVPAK system description and user's guide
[NASA-TM-84782] N82-29024
Intel 8080 orbit propagation program system description and user's guide
[NASA-TM-84783] N82-29025
Evaluation of the IMP-16 microprocessor orbit determination system filter
[NASA-TM-84788] N82-29026
Orbit determination software development for microprocessor based systems: Evaluation and recommendations
[NASA-TM-84794] N82-29028
Automated Orbit Determination System (AODS) requirements definition and analysis
[NASA-TM-84795] N82-29030
Systems Technology Laboratory (STL) library methods and procedures
[NASA-TM-84787] N82-29032
Mathematical specifications of the Onboard Navigation Package (ONPAC) simulator (revision 1)
[NASA-TM-84797] N82-29033
Automated Orbit Determination System (AODS) environment simulator for prototype testing (ADEPT) system description
[NASA-TM-8480'] N82-29035
Preliminary Automated Orbit Determination System (AODS)/AODS environment simulator for prototype testing (ADEPT) user's guide
[NASA-TM-84798] N82-29036
GPSPAC/LANDSAT-D Interface (GLI) system user's guide
[NASA-TM-84784] N82-29038
System description for the Global Positioning Subsystem Experiment Package (GPSPAC) Experiment Data Preprocessor (GEDAP)
[NASA-TM-84785] N82-29039

ORBITAL MECHANICS
Mathematical specifications of the Onboard Navigation Package (ONPAC) simulator (revision 1)
[NASA-TM-84797] N82-29033

OREGON
Airborne gamma-ray spectrometer and magnetometer survey: Crescent quadrangle, Burns quadrangle, Canyon City quadrangle, Bend quadrangle, Salem quadrangle (Oregon)
[DE81-029063] N82-28749
Airborne gamma-ray spectrometer and magnetometer survey Coos Bay, Oregon, volume 1
[DE82-005534] N82-28750
Airborne gamma-ray spectrometer and magnetometer survey, Roseburg Quadrangle, Oregon, volume 1
[DE82-005536] N82-28765

ORGANIC COMPOUNDS
Octanol/water partition coefficients and aqueous solubilities of organic compounds
[PB82-141797] N82-28408
Crystal and molecular structures of selected organic and organometallic compounds and an algorithm for empirical absorption correction
[DE82-005451] N82-29210

ORGANIC MATERIALS
Crack velocities in natural rubber
[AD-A114298] N82-28677

ORGANIC SILICON COMPOUNDS
Chemical reactions and properties of organosilicon compounds related to new materials
[AD-A114377] N82-28451

ORGANIZING
The organizing of conferences
[PB82-142696] N82-28948

ORGANOMETALLIC COMPOUNDS
Chemistry and morphology of coal liquefaction
[DE82-005141] N82-28392
Alcohol Fuels Program Technical Review, summer, 1981
[DE82-006904] N82-28474
Crystal and molecular structures of selected organic and organometallic compounds and an algorithm for empirical absorption correction
[DE82-005451] N82-29210

ORR-SOMMERFELD EQUATIONS
Calculation of linear stability with the aid of asymptotic solutions of Orr-Sommerfeld equation. Part 1. The treatment of the linear stability problems for (alpha)R 1 containing one simple turning point; Two dimensional quasi-parallel flow: Jeffery-Hamel flow
[DE81-700130] N82-29086

ORTHOGONAL FUNCTIONS
Least squares adjustment of large-scale geodetic networks by orthogonal decomposition
[DE82-002253] N82-28758
ORTHOSTATIC TOLERANCE
Regulation of cerebral circulation in erect position N82-28957
OSCILLATORS
Electronically tunable phase locked loop oscillator
[AD-A113253] N82-28556
OSTEOPOROSIS
Osteoporosis in unsupported extremities N82-28970
OVERPRESSURE
TNT equivalency of Cyclotol 70/30
[AD-A113270] N82-28459
OXAZOLE
Preparation of perfluorinated 1,2,4-oxadiazoles
[NASA-CASE-ARC-11267-2] N82-28353
OXIDATION
Initial stages of oxidation on single crystals of lithium hydride interaction between single crystal lithium hydride and a stainless steel, high vacuum container
[DE82-005614] N82-29212
OXIDATION-REDUCTION REACTIONS
The effect of heat transfer on the diffusion-limited cathodic reduction of oxygen on steel in flowing 3.2 percent sodium chloride solution
[NPL-DMA(A)-38] N82-28410
OXYGEN METABOLISM
Effects of low-intensity electromagnetic fields on human and animal erythrocytes N82-28974
OXYGEN SUPPLY EQUIPMENT
Slow opening valve
[NASA-CASE-MSC-20112-1] N82-28641
OZONE
Technical options for reducing chlorofluorocarbon emissions
[RAND-R-2879-EPA] N82-28840
User's guide for the Total-Ozone Mapping Spectrometer (TOMS) instrument first year ozone T data set
[NASA-RP-1096] N82-28880
Modification of method for assaying ozone by the diacetyl dihydrolutidine reaction N82-28973
OZONOMETRY
Second International Ozone Sonde Intercomparison Conference, 5-20 April 1978
[ISSN-0012-4130] N82-28858
Special observations by the Hohenpeissenburg Meteorological Observatory. No. 44: Results of aerological and surface ozone measurements during the first semester of 1981
[ISSN-0581-1287] N82-28877
Modification of method for assaying ozone by the diacetyl dihydrolutidine reaction N82-28973

P

P BAND
Multipath analysis of telemetry support positions for APATS
[AD-A114057] N82-28342
P-TYPE SEMICONDUCTORS
Method of Fabricating Schottky Barrier solar cell
[NASA-CASE-NPO-13689-4] N82-28780
PACIFIC NORTHWEST (US)
Airborne gamma-ray spectrometer and magnetometer survey, Roseburg Quadrangle, Oregon, volume 1
[DE82-005536] N82-28765
PACIFIC OCEAN
Manganese nodule resource data, Sea Scope expedition
[PB82-142571] N82-28768
Pacific area current charts
[AD-A112293] N82-28930
PAINTS
Determination of the effect of composition, structure and electrochemical mass transport properties on adhesion and corrosion inhibition of paint films
[AD-A113975] N82-28448
PAIR PRODUCTION
Lifetimes and production properties of charmed particles
[DE82-005302] N82-29140
PARABOLIC REFLECTORS
Cassegrain dual reflector antenna design --- MSAT UHF antenna N82-28336
Multiple beam offset antenna design processes --- MSAT antenna N82-28340
Offset reflector antennas: Design, computation, construction and pattern measurements
[DFVLR-MITT-81-33] N82-28535
Engineering development studies for integrated evacuated CPC arrays
[DE82-005676] N82-28568
PARALLEL PROCESSING (COMPUTERS)
Optimixing synchronous systems
[AD-A113916] N82-29015
Research program in fully distributed processing systems
[AD-A114199] N82-29018
PARAMAGNETISM
High gradient magnetic separation applied to liquid-liquid separation
[PB82-142811] N82-28495
PARAMETER IDENTIFICATION
Multi-sample cluster analysis with varying parameters using Alkaike's information criterion
[AD-A113422] N82-29080
Implementation of information technology in office settings: Review of relevant literature
[RAND-P-6697] N82-29224
PARAMETERIZATION
Dynamic analysis and simulation of a large scale thermal simulator
[DE82-005588] N82-28802
PARSING ALGORITHMS
PARSER: A tool for command interpretation
[DE82-006829] N82-29064
PARTIAL DIFFERENTIAL EQUATIONS
Solving the Navier-Stokes equations with LSODI and the method of lines
[DE82-006179] N82-28594
Some computational aspects of the boundary collocation method for linear partial differential equations and related questions
[TRITA-NA-8119] N82-29090
PARTICLE ACCELERATORS
Saturn 2: Joint project of the CEA and the IN2P3: Detection measurement electrode
[DE82-003204] N82-29133
Particle beam weapons
[AD-A114383] N82-29147
Plasmas in particle accelerators: A hydrodynamic model of three-dimensional electrostatic instabilities
[DE82-006182] N82-29186
PARTICLE BEAMS
Saturn 2: Joint project of the CEA and the IN2P3: Detection measurement electrode
[DE82-003204] N82-29133
Particle beam weapons
[AD-A114383] N82-29147
Particle-beam fusion
[DE82-002900] N82-29183
PARTICLE DENSITY (CONCENTRATION)
Acoustic particle separation
[NASA-CASE-NPO-15559-1] N82-29112
PARTICLE DIFFUSION
Acoustic particle separation
[NASA-CASE-NPO-15559-1] N82-29112
PARTICLE ENERGY
Study of low energy electron flux and its reaction to active experimentation on Spacelab --- development of electronic units
[INW-8101] N82-28612
PARTICLE INTERACTIONS
Electron beam transport in the ionosphere: Energy deposition and optical emissions based upon the combined effects of plasma turbulence and particle-particle interactions
[AD-A114376] N82-28868
PARTICLE SIZE DISTRIBUTION
Analysis of the atmospheric aerosol size distribution information retrievable from near-limb angular radiance measurements taken on Mauna Loa, Hawaii
[DE82-005999] N82-28851
Acoustic particle separation
[NASA-CASE-NPO-15559-1] N82-29112
PARTICLES
Auroral particle distribution functions and their relationships to inverted Vs and auroral arcs
[AD-A114365] N82-28867
PATTERN RECOGNITION
Report of subpanel on feature extraction N82-28702
Misregistration's effects on classification and proportion estimation accuracy N82-28731
Algorithms for autonomous star identification
[NASA-TM-84789] N82-29031
PATTERN REGISTRATION
Proceedings of the NASA Workshop on Registration and Rectification
[NASA-CR-169133] N82-28699
Workshop rationale N82-28700
Report of subpanel on feature extraction N82-28702
Report of subpanel on inter-image matching N82-28703
USDA registration and rectification requirements N82-28708
Needs for registration and rectification of satellite imagery for land use and land cover and hydrologic applications N82-28709
Registration and rectification needs of geology N82-28710
Data registration and integration requirements for severe storms research N82-28711
Thematic mapper performance N82-28714
Scanner imaging systems, aircraft N82-28715
MLA imaging systems N82-28716
Geometric and rediametric distortion in spaceborne SAR imagery N82-28717
Geometric verification N82-28730
Misregistration's effects on classification and proportion estimation accuracy N82-28731
Modeling misregistration and related effects on multispectral classification N82-28733
A concept for a future ground control data set for image correction N82-28738
PAYLOADS
Pointing payload for single tether balloons and other projects
[AD-A114447] N82-28259
PCM TELEMETRY
A PCM encoder for balloon sondes
[INW-8102] N82-28344
PELLETS
Pelletization and roll encapsulation of phase-change materials
[DE82-000162] N82-28389
PENDULUMS
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-169131] N82-28282
PENETRATION
Tungsten alloy fabrication of penetrator materials
[AD-A114187] N82-28419
PEPTIDES
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Monograph on new direction of chemistry and biology of peptide and protein bioregulators reviewed N82-28979
PERFLUORO COMPOUNDS
Preparation of perfluorinated 1,2,4-oxadiazoles
[NASA-CASE-ARC-11267-2] N82-28353
PERFORMANCE PREDICTION
A simulation system for validating the analytical prediction of performance of the convolutional encoded and symbol interleaved TDRSS S-band return link service in a pulsed RFI environment
[NASA-CR-170428] N82-28500
Heat pump operating with a mixture of fluids
[PB82-143611] N82-28602
PERFORMANCE TESTS
Project Vulcan: The development of a gasdynamic heater. Volume 2: Heat transfer and performance analyses for a gasdynamic heater with helical impellers
[DE82-006788] N82-28595
PERIODICALS
The shock and vibration digest, volume 14, no. 5
[AD-A115091] N82-28659
Concepts, the Journal of Defense Systems Acquisition Management, Autumn 1981, volume 4, number 4
[AD-A113130] N82-29220
PERSONNEL MANAGEMENT
Empirical comparison of binary and continuous proximity measures for clustering occupational task data
[AD-A112930] N82-29097
PERTURBATION
The dynamics of mean circulation on the continental shelf
[PB82-157082] N82-28943

PERTURBATION THEORY
High-order terms in sensitivity analysis through a differential approach
[LA-8813-MS] N82-29072
PETROLEUM PRODUCTS
Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids N82-28788
PETROLOGY
Nevada nuclear waste storage investigations
[DE82-004722] N82-29150
PH FACTOR
Domestic swine in physiological research. 3: Blood gas and acid-base values of arterial and venous blood from young anesthetized pigs maintained under steady-state ventilatory conditions
[AD-A111834] N82-28945
PHASE CHANGE MATERIALS
Pelletization and roll encapsulation of phase-change materials
[DE82-000162] N82-28389
Thermal energy storage in phase change material
[AD-A113355] N82-28793
PHASE DETECTORS
Application of phase retrieval
[AD-A113383] N82-29161
PHASE SHIFT CIRCUITS
Polarized Quasi-Optical phase shifter
[AD-A114300] N82-29165
PHASE TRANSFORMATIONS
Effects of cobalt on the microstructure of Udimet 700
[NASA-CR-165605] N82-28409
PHASED ARRAYS
Multipath analysis of telemetry support positions for APATS
[AD-A114057] N82-28342
NASA Adaptive Multibeam Phased Array (AMPA): An application study
[NASA-CR-169125] N82-28503
Tent shaped phased array rests
[AD-A113191] N82-28516
PHENOLOGY
Reports from the German Meteorological Service. Number 158: Contribution to phenology of Europe 4 long term phenological observation series for western, central, and eastern Europe
[ISSN-0072-4130] N82-28876
PHOTOCHEMICAL REACTIONS
Sensitized photo-reduction of methyl viologen by metalloporphyrins
[AD-A114443] N82-28381
One-and two dimensional photochemical modeling of the chemical interactions in the middle atmosphere (0-120 km)
[PB82-156613] N82-28874
PHOTOELASTICITY
Stress anlaysis of two mini-hat pressure gage designs
[AD-A112186] N82-28607
Quasi-square hole with optimum shape in an infinite plate subjected in in-plane loading. Optimization of inner and outer boundaries of beams and plates with holes
[AD-A114370] N82-28679
PHOTOELECTRIC CELLS
Photoelectric detection system — manufacturing automation
[NASA-CASE-MFS-23776-1] N82-28545
PHOTOELECTROCHEMISTRY
Advanced solar energy research program
[DE82-004791] N82-28813
PHOTOELECTRONS
Charge transfer spectra and photoelectron emission by solutions
[AD-A114054] N82-29126
PHOTOGRAMMETRY
Earth Resources: A continuing bibliography with indexes, issue 33
[NASA-SP-7041(33)] N82-28695
Photogrammetric aspects of remapping procedures N82-28726
Current status of metric reduction of (passive) scanner data N82-28739
PHOTOGRAPHY
Development of slide program describing site-selection process for Small Wind Energy Conversion Systems (SWECS)
[DE82-006209] N82-28831
PHOTOLYSIS
Photocatalytic hydrogen production from water and intermetallic compound formation on single-crystal surfaces of titanium oxides
[DE82-004952] N82-28393
Kinetic studies of organochromium (3) cations and their hydrido analog
[DE82-005581] N82-28397
PHOTOMAPPING
Inventory of available data elements for the San Bernardino, California region
[NASA-CR-166354] N82-28698
PHOTOMETERS
CO2 laser photoacoustic detection of hydrazine based rocket fuels
[AD-A112950] N82-28632
PHOTONEUTRONS
Photoneutron generation with electron undulators
[DE82-007034] N82-29142
PHOTONS
Tables and graphs of photon-interaction cross sections from 0.1 keV to 100 MeV derived from the LLL evaluated-nuclear-data library
[DE82-004819] N82-29139
Study of photoexcited states by positron method
[DE82-005469] N82-29143
Comptonization of photons in compact cosmic X-ray sources
[MPI-PAE/EXTRATERR-171] N82-29171
PHOTONUCLEAR REACTIONS
Photoneutron generation with electron undulators
[DE82-007034] N82-29142
PHOTOOXIDATION
Studies in chemical reactivity
[DE82-006891] N82-28407
PHOTOTHERMAL CONVERSION
Engineering development studies for integrated evacuated CPC arrays
[DE82-005676] N82-28568
PHOTOVOLTAIC CELLS
Intermediate photovoltaic system application experiment operational performance report. Volume 3: Mt. Laguna Radar Station, Mt. Laguna, California
[DE82-003006] N82-28809
Design handbook for photovoltaic power systems. Volume 1: Simplified methods for utility interconnected systems
[DE82-003108] N82-28810
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE82-004259] N82-28811
Design studies for concentrating photovoltaic arrays
[DE82-005113] N82-28812
Intermediate photovoltaic system application experiment operational performance report. Volume 4: Mt. Laguna Radar Station, Mt. Laguna, Calif.
[DE82-007565] N82-28835
Intermediate photovoltaic system application experiment operational performance report. Volume 5: Newman Power Station Site, El Paso, Tex.
[DE82-007566] N82-28836
PHOTOVOLTAIC CONVERSION
Probable impacts of budgets reductions on the development and use of photovoltaic energy systems
[EMD-82-60] N82-28781
Application, sizing, testing and performance of the photovoltaic battery subsystem at Natural Bridges National Monument, Utah
[DE82-007040] N82-28832
Photovoltaics and electric utilities — capital investment and revenue requirement
[DE82-006994] N82-28833
PHYSICAL EXERCISE
Physiological studies of heat stress acclimation during a specific exercise regimen
[AD-A111897] N82-28991
Acclimatization to dry heat: Active men versus active women
[AD-A111708] N82-28993
PHYSICAL FITNESS
Task analysis and the ability requirements of tasks: Collected papers
[AD-A111181] N82-29000
PHYSICAL OPTICS
Fundamentals and techniques of nonimaging optics for solar-energy concentration
[DE82-004885] N82-28830
PHYSICAL PROPERTIES
Properties of materials using acoustic waves
[AD-A114124] N82-29113
PHYSICAL WORK
Slow waves of cardiac rhythm in healthy man under different conditions N82-28955
PHYSIOLOGICAL EFFECTS
Endurance of +Gz G forces by middle-aged people before and after 7-day immersion N82-28958
Effect of high ambient temperature on carbohydrate metabolism in rat liver and skeletal muscles N82-28975
PHYSIOLOGY
Domestic swine in physiological research. 3: Blood gas and acid-base values of arterial and venous blood from young anesthetized pigs maintained under steady-state ventilatory conditions
[AD-A111834] N82-28945
PIEZOELECTRIC TRANSDUCERS
Micro-g triaxial piezoelectric satellite accelerometer system development
[AD-A113849] N82-28347
PILOT PERFORMANCE
Aids to navigation principal findings on the CAORF experiment. The performance of visual aids to navigation as evaluated by simulation
[AD-A107045] N82-28271
Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302
Problem of accelerations in aviation medicine N82-28950
Vibration and assessment of this flight factor by pilots N82-28976
PILOT PLANTS
Upstream H2S removal from geothermal steam
[DE82-901293] N82-28847
PILOT TRAINING
Vibration and assessment of this flight factor by pilots N82-28976
PINNING
Controlled grain boundary structures in superconductors
[AD-A114243] N82-29208
PIONEER 10 SPACE PROBE
NASA report to educators, volume 10, no. 1 N82-29216
Pioneer 10/11 data analysis of the magnetic field experiment
[NASA-CR-166366] N82-29251
PIONEER 11 SPACE PROBE
Pioneer 10/11 data analysis of the magnetic field experiment
[NASA-CR-166366] N82-29251
PIPE FLOW
NBS/ESDS: A computer model for the simulation of hot water systems
[PB82-139361] N82-28492
Computation of laminar and turbulent flow in 90 deg square duct and pipe bends using the Navier-Stokes equations
[AD-A114258] N82-28589
PIPE NOZZLES
External loads on nozzles in cylindrical shells
[CRIF-MT-146] N82-28687
PIPES (TUBES)
Measurement of sound power flow in bending waves along pipes. Part 2: Influence of a near field on measurements with two accelerometers
[TPD-008-785/1] N82-29117
PIPETTES
Microelectronic electrode probe for testing brain electrical activity N82-28982
PISTONS
Evaluation of requirements for militarization of 3 kW free piston Stirling engine generator sets
[AD-A113409] N82-28648
PITOT TUBES
Study of boundary-layer transition using transonic cone Preston tube data
[NASA-CR-169130] N82-28579
PITS (EXCAVATIONS)
The effects of lease size on yields from oil shale surface mines
[RAND/N-1798-DOE] N82-28697
PLANETARY MAGNETIC FIELDS
Pioneer 10/11 data analysis of the trapped radiation experiment
[NASA-CR-166360] N82-28312

On the nature of magnetic fields in the vicinity of Mars
[REPT-672] N82-29249
Pioneer 10/11 data analysis of the magnetic field experiment
[NASA-CR-166366] N82-29251
PLANETARY NEBULAE
Determination of the intrinsic Q(3)/5(1) line intensity ratio of molecular hydrogen
[ATR-82(8415)-1] N82-29247
PLANETARY WAVES
LRIR observations of the structure and propagation of the stationary planetary waves in the Northern Hemisphere during December 1975
[PB82-156639] N82-28921
PLANKTON
Biota and biological principles of the aquatic environment
[CIRC-848-A] N82-28688
PLANNING
The organizing of conferences
[PB82-142696] N82-28948
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901260] N82-29106
PLANTS (BOTANY)
Biota and biological principles of the aquatic environment
[CIRC-848-A] N82-28688
PLASMA ACCELERATORS
Production of a fast high density plasma flow
[TUM-LRT-TB-81/14] N82-29194
PLASMA CLOUDS
Distribution of the magnetic field in Halley's comet tail obtained from the plasma cloud kinetics
[REPT-673] N82-29250
PLASMA COMPRESSION
Feedback control of thermal runaway with compression-decompression
[IPPJ-573] N82-29175
Drift resistive interchange and tearing modes in cylindrical geometry
[AD-A113499] N82-29179
PLASMA CONTROL
Feedback control of thermal runaway with compression-decompression
[IPPJ-573] N82-29175
Mirror fusion test facility status
[DE82-006187] N82-29185
Confinement and magnetoacoustic heating of a low density belt pinch plasma
[IPF-81-8] N82-29196
PLASMA DIAGNOSTICS
Radiation from high temperature plasmas
[AD-A113597] N82-29177
Spot spectroscopy: Local spectroscopic measurements within laser produced plasmas
[AD-A114165] N82-29180
Ion emission characteristics of plasma focus devices
[IPF-81-9] N82-29197
Ion motion in the plasma focus
[IPF-81-11] N82-29198
First 50 pulse per sec Thomson scattering diagnostics in a Tokamak
[IPF-81-13] N82-29199
PLASMA EQUILIBRIUM
Toroidal plasma MHD equilibrium code EQUCIR version 1
[DE81-700128] N82-29193
PLASMA FOCUS
Ion emission characteristics of plasma focus devices
[IPF-81-9] N82-29197
Ion motion in the plasma focus
[IPF-81-11] N82-29198
PLASMA GENERATORS
The electron avalanche ionization of air and a simple air chemistry model
[AD-A113501] N82-28864
RF plasma sources for neutral-beam-injection systems. Phase 1: Definition study
[DE82-004193] N82-29182
Production of a fast high density plasma flow
[TUM-LRT-TB-81/14] N82-29194
PLASMA GUNS
The radial variation of the ionization in a coaxial plasma gun operated under critical velocity conditions
[TRITA-EPP-81-07] N82-29195
PLASMA HEATING
Turbulent heating and filament structure of field-aligned current with anomaous resistivity
[REPT-680] N82-28855
Confinement and magnetoacoustic heating of a low density belt pinch plasma
[IPF-81-8] N82-29196
Experimental studies of anomalous plasma heating in TORTUR 2
[REPT-82-141] N82-29200
PLASMA PINCH
Confinement and magnetoacoustic heating of a low density belt pinch plasma
[IPF-81-8] N82-29196
PLASMA PROPULSION
Electric propulsion --- pulsed plasma thruster and electron bombardment ion engine for MSAT attitude control and stationkeeping N82-28341
PLASMA TURBULENCE
Electron beam transport in the ionosphere: Energy deposition and optical emissions based upon the combined effects of plasma turbulence and particle-particle interactions
[AD-A114376] N82-28868
PLASMA WAVES
Measurement and use of the plasma current waveform in an RF silane discharge
[DE82-005119] N82-28566
Plasma assessments for the Fusion Engineering Device (FED)
[DE82-004649] N82-29184
PLASMA-PARTICLE INTERACTIONS
Instantons in the quark plasma. The role of Fermion zero modes
[REPT-677] N82-29174
PLASMAS (PHYSICS)
Airglow imaging studies of natural and artificially induced ionospheric disturbances
[AD-A114369] N82-28866
Electron beam transport in the ionosphere: Energy deposition and optical emissions based upon the combined effects of plasma turbulence and particle-particle interactions
[AD-A114376] N82-28868
Analysis of a rail gun plasma accelerator
[AD-A114043] N82-29125
On the nonlinear conductivity tensor for an unmagnetized relativistic turbulent plasma
[AD-A113699] N82-29176
Reduction of spectral interferences in inductively coupled plasma-atomic emission spectrometry by selective spectral-line modulation
[AD-A112886] N82-29178
Plasmas in particle accelerators: A hydrodynamic model of three-dimensional electrostatic instabilities
[DE82-006182] N82-29186
PLASTIC AIRCRAFT STRUCTURES
Development of materials and manufacturing technology over the next 20 years: Composite materials
[MBB-UD-341-82-O] N82-28365
PLATINUM
Electrocatalysis of the oxidations of some organic compounds on noble-metal electrodes by foreign-metal ad-atoms
[DE82-005619] N82-28406
PLOTS
Development of a RELAP model for the Barstow thermal-storage subsystem
[DE82-006828] N82-28819
PLOTTERS
Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer
[AD-A112900] N82-28310
PLOTTING
BGRAPH: A program for biplot multivariate graphics. Version 1: User's guide
[AD-A114449] N82-29051
PLUTONIUM
Radioelement studies in the oceans
[DE82-003705] N82-28942
PLUTONIUM ISOTOPES
Acquisition and performance evaluation of a quadrupole mass spectrometer in a mobile laboratory --- for isotopic analysis
[DE82-004668] N82-28611
PLUTONIUM OXIDES
Environmental and radiological safety studies. Interaction of Pu-23802 heat sources with terrestrial and aquatic environments
[DE82-004681] N82-28848
PLUTONIUM 238
Environmental and radiological safety studies. Interaction of Pu-23802 heat sources with terrestrial and aquatic environments
[DE82-004681] N82-28848
PLY ORIENTATION
An optimal design of simple symmetric laminates under the first ply failure criteria
[AD-A113689] N82-28357
PNEUMATIC EQUIPMENT
Analysis of Dense-Phase Fine-Coal Pneumatic Systems
[DE82-010243] N82-28759
POINT SPREAD FUNCTIONS
A quantitative assessment of resampling errors N82-28728
POINTS
Development of a RELAP model for the Barstow thermal-storage subsystem
[DE82-006828] N82-28819
POLAND
Bulletin of hydrological and meteorological Service, selected articles
[AD-A114382] N82-28910
POLAR CAPS
MIZEX. A program for mesoscale air-ice-ocean interaction experiments in Arctic marginal ice zones. 1: Research strategy
[AD-A107046] N82-28740
Occurrences of the polar slant E condition (SEC) at Narssarssuaq, Godhavn, Thule, Denmark for 1980 N82-28873
POLAR REGIONS
Modeling of high-latitude currents in a substorm
[AD-A114311] N82-28865
POLARIZATION (WAVES)
Mobile vehicle antenna N82-28329
Dual polarization N82-28338
POLARIZERS
Polarized Quasi-Optical phase shifter
[AD-A114300] N82-29165
POLAROGRAPHY
The use of polarographic and potentiometric methods in structural analysis
[DRIC-T-6575] N82-28667
POLLUTION CONTROL
A Rand note: Policy analysis of water management for the Netherlands. Volume 3: Screening of eutrophication control tactics
[RAND/N-1500/3-NETH] N82-28691
Potential costs of complying with emission regulations for an indirect coal-liquefaction process
[DE82-001471] N82-28845
POLYATOMIC MOLECULES
Studies in chemical reactivity
[DE82-006891] N82-28407
Studies in energetic material dynamics
[AD-A114226] N82-29129
POLYBUTADIENE
Chemical design of elastomeric behavior
[AD-A114335] N82-28454
POLYETHYLENES
Enhancement of the stability of common polymeric materials against undersea degradation
[PB82-163015] N82-28458
POLYMER CHEMISTRY
Preparation of perfluorinated 1,2,4-oxadiazoles
[NASA-CASE-ARC-11267-2] N82-28353
Endor studies of radiation-produced trapped electrons and radicals in disordered systems and radical matrix interactions in polymers and on surfaces
[AD-A114321] N82-28455
POLYMER MATRIX COMPOSITES
Endor studies of radiation-produced trapped electrons and radicals in disordered systems and radical matrix interactions in polymers and on surfaces
[AD-A114321] N82-28455
POLYMERIC FILMS
Texturing polymer surfaces by transfer casting --- cardiovascular prosthesis
[NASA-CASE-LEW-13120-1] N82-28440

Method for the preparation of thin-skinned asymmetric reverse osmosis membranes and products thereof
[NASA-CASE-ARC-11359-1] N82-28444

POLYMERIZATION
An SCF-X alpha-SW molecular-orbital study of a possible reaction path for Ziegler-Natta catalysts
[AD-A113559] N82-28373

POLYMERS
Polycyclic high energy oxidizers
[AD-A112585] N82-28446
Wall layer structure and drag reduction: Role of vicous sublayer
[AD-A112980] N82-28581
Automated torsion pendulum: Control and data collection/reduction using a desktop computer
[AD-A113038] N82-28670

POLYMETHYL METHACRYLATE
Enhancement of the stability of common polymeric materials against undersea degradation
[PB82-163015] N82-28458

POLYNOMIALS
Polynomial signals and polynomial transformations
[FUB-28-1981] N82-29066
Fitting a polynomial to data in the presence of noise
[AD-A112984] N82-29081
Fundamentals of number theory and polynominals algebra for numerical signal processing
[FUB-27-1981] N82-29087

POLYPROPYLENE
Enhancement of the stability of common polymeric materials against undersea degradation
[PB82-163015] N82-28458

POLYSTYRENE
Enhancement of the stability of common polymeric materials against undersea degradation
[PB82-163015] N82-28458
Technical options for reducing chlorofluorocarbon emissions
[RAND-R-2879-EPA] N82-28840

POPULATIONS
Complete statistical ranking of populations, with tables and applications
[AD-A114400] N82-29098

PORPHYRINS
Sensitized photo-reduction of methyl viologen by metalloporphyrins
[AD-A114443] N82-28381

POSITION (LOCATION)
Geometric verification N82-28730
Orienting and exploratory behavior of gray rat in open field. Zoopsychological analysis N82-28981
Saturn 2: Joint project of the CEA and the IN2P3: Detection measurement electrode
[DE82-003204] N82-29133

POSITION ERRORS
Report of the Subpanel on Error Characterization and Error Budgets N82-28706
Spacecraft induced error sources N82-28718

POSITIONING
Inertial surveying technology
[AD-A107379] N82-28863

POSITRONIUM
Study of photoexcited states by positron method
[DE82-005469] N82-29143

POTASSIUM
Osteoporosis in unsupported extremities N82-28970

POTASSIUM BROMIDES
Alkali halide FLIR lens development
[AD-A113845] N82-29158

POTENTIAL FLOW
Computer program for calculating full potential transonic, quasi-three-dimensional flow through a rotating turbomachinery blade row
[NASA-TP-2030] N82-28247

POTENTIOMETRIC ANALYSIS
The use of polarographic and potentiometric methods in structural analysis
[DRIC-T-6575] N82-28667

POWDER (PARTICLES)
FORTRAN 4 program for calculating X-ray powder diffraction patterns version 9/10
[DE82-003893] N82-29062

POWDER METALLURGY
International aviation (selected articles)
[AD-A114422] N82-28245
Improvement of transverse strength in graphite-aluminum composites by high-strength surface foils
[AD-A114105] N82-28360
Effect of defects in aluminum P/M
[AD-A113134] N82-28416
Magnetic properties of alloys containing mischmetal, cobalt, copper, iron, and magnesium
[PB82-158940] N82-28439
Consolidation of an iron-base superalloy by powder metallurgy techniques
[PB82-135906] N82-28493
Non-destructive evaluation of defects in structural materials using long-wavelength neutrons
[AD-A113500] N82-28656

POWER AMPLIFIERS
Intermodulation analysis — MSAT antenna N82-28339
Electronically tunable amplifier technology
[AD-A113193] N82-28555
Multimode amplifier
[AD-A113254] N82-28557

POWER CONDITIONING
Impact of advanced power semiconductor systems on utilities and industry
[DE82-901286] N82-28547
Design handbook for photovoltaic power systems. Volume 1: Simplified methods for utility interconnected systems
[DE82-003108] N82-28810

POWER EFFICIENCY
On the power output of some idealized source configurations with one or more characteristic dimensions
[NASA-CR-169132] N82-29074

POWER SPECTRA
Power spectra of geomagnetic fluctuations between 0.02 and 20 Hz
[AD-A113848] N82-28861

PRECIPITATION (CHEMISTRY)
Galvanically precipitated aluminum: A new material — for protective coating
[MBB-515-82-O] N82-28431

PRECIPITATION (METEOROLOGY)
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Bangor International/Dow AFB, Maine. Parts A-F
[AD-A113178] N82-28696
Bulletin of hydrological and meteorological Service, selected articles
[AD-A114382] N82-28910
Fine scale structures in time and space of rainfall rate — Sweden
[FOA-C-20448-E2] N82-28919

PREDICTION ANALYSIS TECHNIQUES
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685

PREPREGS
Low cost 2-D heatshield materials — braided tapes
[AD-A113928] N82-28355

PREPROCESSING
System description for the Global Positioning Subsystem Experiment Package (GPSPAC) Experiment Data Preprocessor (GEDAP)
[NASA-TM-84785] N82-29039
Structured FORTRAN preprocessor (SFORT) PDP-11/70 user's guide
[NASA-TM-84790] N82-29040
INPUTP (general purpose input processor). User guide
[AD-A114257] N82-29055

PRESSURE DISTRIBUTION
Surface pressure measurements on a boattailed projectile shape at transonic speeds
[AD-A113520] N82-28258
Calculation of the unsteady pressure distribution on an oscillating cascade with thick profiles and steady turning angle
[DFVLR-FB-81-38] N82-28600
The annual variation of the large-scale 500 mb and sea level pressure fields
[DM-35] N82-28918

PRESSURE GAGES
Stress anlaysis of two mini-hat pressure gage designs
[AD-A112186] N82-28607

PRESSURE GRADIENTS
Influence of surface static-pressure orifices on boundary-layer transition — tests conducted in the Langley Low-Turbulence Pressure Tunnel
[NASA-TM-84492] N82-28248

PRESSURE MEASUREMENT
Surface pressure measurements on a boattailed projectile shape at transonic speeds
[AD-A113520] N82-28258

PRESSURE REDUCTION
Feedback control of thermal runaway with compression-decompression
[IPPJ-573] N82-29175

PRESSURIZED CABINS
Modification of method for assaying ozone by the diacetyl dihydrolutidine reaction N82-28973

PRINTED CIRCUITS
Trend inspection station for printed circuit board soler joints, ultrasonic subsystem
[AD-A112918] N82-28655

PROBABILITY DENSITY FUNCTIONS
A bivariate gamma probability distribution with application to gust modeling — for the ascent flight of the space shuttle
[NASA-TM-82483] N82-29094

PROBABILITY DISTRIBUTION FUNCTIONS
Some new multivariate distributions with enhanced comparisons via contour and three dimensional plots
[LA-8903-MS] N82-29071
A bivariate gamma probability distribution with application to gust modeling — for the ascent flight of the space shuttle
[NASA-TM-82483] N82-29094

PROBLEM SOLVING
Solving the Navier-Stokes equations with LSODI and the method of lines
[DE82-006179] N82-28594
Program package for solving linear optimization problems. User's manual
[DE81-700125] N82-29065
Are robustness measures robust — quantification and optimization of decision making in solving policy problems
[RAND/P-6734] N82-29073
Unconstrained minimization by interpolation: Rates of convergence
[AD-A114115] N82-29082
Comparison of some methods for solving sparse linear least squares problems
[DE82-004651] N82-29084
Inverse of a Laplace transform and its numerical evaluation
[DE82-004667] N82-29085
PLANNERS' WORKBENCH: A computer aid to the re-planning
[AD-A113331] N82-29219

PROCESS CONTROL (INDUSTRY)
Photoelectric detection system — manufacturing automation
[NASA-CASE-MFS-23776-1] N82-28545

PROCESS HEAT
Evaluation of nonelectrical energy-transmission options
[DE82-000886] N82-28821

PROCUREMENT MANAGEMENT
Concepts, the Journal of Defense Systems Acquisition Management, Autumn 1981, volume 4, number 4
[AD-A113130] N82-29220
Study of increasing lead times in major weapon systems acquisition
[AD-A113459] N82-29221

PRODUCT DEVELOPMENT
Electronically tunable phase locked loop oscillator
[AD-A113253] N82-28556
Electrodeless fluorescent lamp
[DE82-005147] N82-28564
Development and construction of separator rods for the double circular guide system (DCS): Circular guide radii R1 = 0.05/0.75 mm; R2 = 0.04/0.025 mm
[MBB-UR-534-82-O] N82-29154
Electric vehicles: Limited range and high costs hamper commercialization
[EMD-82-38] N82-29234

PRODUCTION PLANNING
Cobalt availability-domestic: A minerals availability system appraisal
[PB82-135435] N82-28438

Study of increasing lead times in major weapon systems acquisition
[AD-A113459] N82-29221
PROGRAM TREND LINE ANALYSIS
Future communication satellite systems and technology trends
[MBB-UB-542-81-O] N82-28322
PROGRAMMING LANGUAGES
Computer-aided design and fabrication of wire-wrap (trademark) type circuit boards: A new symbolism and its implementation
[AD-A113439] N82-28559
Rule-based programming for human-computer interface specification
[AD-A113036] N82-29007
PARSER: A tool for command interpretation
[DE82-006829] N82-29064
PROJECT PLANNING
Realistic approach to the planning of high technology, high risk projects
[DE82-001049] N82-29223
PROJECTILES
Surface pressure measurements on a boattailed projectile shape at transonic speeds
[AD-A113520] N82-28258
PROJECTIVE GEOMETRY
Map projections for larger-scale mapping
N82-28722
PROLONGATION
Problem of accelerations in aviation medicine
N82-28950
PROPAGATION MODES
Stability of superconducting ISABELLE dipole magnets
[DE82-006843] N82-29190
PROPELLANT COMBUSTION
Combustion studies of Very High Burning Rate (VHBR) propellants
[AD-A113029] N82-28465
PROPELLANT GRAINS
The relationship between ballistic behavior and structural microdefects of T propellant. An application of SEM in the study of doublebase propellant
[AD-A114381] N82-28351
PROPELLANT PROPERTIES
The relationship between ballistic behavior and structural microdefects of T propellant. An application of SEM in the study of doublebase propellant
[AD-A114381] N82-28351
PROPELLANT TESTS
The relationship between ballistic behavior and structural microdefects of T propellant. An application of SEM in the study of doublebase propellant
[AD-A114381] N82-28351
PROPELLANTS
Combustion studies of Very High Burning Rate (VHBR) propellants
[AD-A113029] N82-28465
PROPELLER BLADES
Fifteen years experience with composite propeller blades --- for hovercraft N82-28363
PROPELLER DRIVE
Fundamentals of electrical propulsion plant design
[AD-A114423] N82-28561
PROPELLER SLIPSTREAMS
Fast generation of three-dimensional computational boundary-conforming periodic grids of C-type --- for turbine blades and propellers
[NASA-CR-165596] N82-28253
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation
[TPD-908-720] N82-29116
PROPELLERS
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation
[TPD-908-720] N82-29116
PROPULSION SYSTEM CONFIGURATIONS
Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference --- wind tunnel tests
[NLR-MP-81020-U] N82-28262
PROSTHETIC DEVICES
Texturing polymer surfaces by transfer casting --- cardiovascular prosthesis
[NASA-CASE-LEW-13120-1] N82-28440
PROTECTION
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364
PROTECTIVE COATINGS
Galvanically precipitated aluminum: A new material --- for protective coating
[MBB-515-82-O] N82-28431
Method of protecting a surface with a silicon-slurry/aluminide coating --- coatings for gas turbine engine blades and vanes
[NASA-CASE-LEW-13343-1] N82-28441
Alkali halide FLIR lens development
[AD-A113845] N82-29158
PROTEINS
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Monograph on new direction of chemistry and biology of peptide and protein bioregulators reviewed
N82-28979
PROTONS
NMR studies of oriented molecules
[DE82-005258] N82-29134
PROTOTYPES
Emission characterization of an alcohol/diesel-pilot fueled compression ignition engine and its heavy-duty diesel counterpart
[PB82-154113] N82-28654
The Transrapid test system in Emsland --- magnetic levitation railway
[MBB-543/81-O] N82-29237
PROXIMITY
Empirical comparison of binary and continuous proximity measures for clustering occupational task data
[AD-A112930] N82-29097
PROXIMITY EFFECT (ELECTRICITY)
Proximity effect in Cu-NbSn composites
[DE82-005449] N82-28361
PSYCHOLOGY
Adapative motivation theory
[AD-A111195] N82-28997
PSYCHROMETERS
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Kansas City IAP, Missouri. Parts A-F
[AD-A113179] N82-28895
PULSE AMPLITUDE
Attenuation of large amplitude pressure disturbances by liquid droplets
[AD-A114250] N82-28636
PULSE COMMUNICATION
Availability analysis of a multiplex system
[FUB-30-1981] N82-28533
Methodology for the description and validation of communication protocols --- mathematical models
[FUB-31-1981] N82-28534
PULSE COMPRESSION
Frequency compression of wideband signals using a distributed sampling technique
[AD-A113428] N82-28519
PULSE RATE
Stability of a 100-kV self-firing spark gap
[DE82-005718] N82-28570
PULSED LASERS
Chemical structure by laser-produced X-rays
[AD-A113864] N82-28627
Laser-generated electron emission from surfaces: Effect of the pulse shape on temperature and transient phenomena
[AD-A114282] N82-28633
Attenuation of large amplitude pressure disturbances by liquid droplets
[AD-A114250] N82-28636
First 50 pulse per sec Thomson scattering diagnostics in a Tokamak
[IPF-81-13] N82-29199
PULSED RADIATION
The frequency shift of a pulse by a time-independent, dispersive, lossy medium
[PB82-161977] N82-28542
PULSEJET ENGINES
Underwater power source study
[AD-A112644] N82-28792
PUSHBROOM SENSOR MODES
Conept for a multiple resolution pushbroom sensor
N82-28735
A concept for a future ground control data set for image correction N82-28738
PYROHYDROLYSIS
Rapid hydropyrolysis of sub-bituminous and bituminous coals
[DE82-000776] N82-28469
PYROLYSIS
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004180] N82-28390
Catalytic coal conversion support: Use of laser flash pyrolysis for structural analysis
[DE82-004176] N82-28391
Thermal analysis of SYNROC gel microspheres
[DE82-003472] N82-28399
Rapid hydropyrolysis of sub-bituminous and bituminous coals
[DE82-000776] N82-28469
PYROMETALLURGY
A pyrometallurgical method for processing Ni-Cd scrap batteries
[PB82-145426] N82-28435

Q

QUADRATIC PROGRAMMING
Program package for solving linear optimization problems. User's manual
[DE81-700125] N82-29065
QUALITY CONTROL
Quality control and nondestructive evaluation techniques for composites. Part 7: Thermography: A state-of-the-art review
[AD-A114392] N82-28657
QUANTITATIVE ANALYSIS
Quantitative thermal desorption spectrometry of noble gases in solids N82-28369
Quantitative thermal description spectrometry of ionically implanted inert gases. 1: Fundamental aspects N82-28370
Quantitative thermal desorption spectrometry of ionically implanted inert gases. 2: Technical requirements N82-28371
QUANTUM THEORY
Schroedinger equation in the quantim field theory with nonlocal
[JINR-E2-80-705] N82-29214
QUARKS
Instantons in the quark plasma. The role of Fermion zero modes
[REPT-677] N82-29174
QUARTZ CRYSTALS
New sensor concepts: Low cost vibrating beam accelerometer
[AD-A113644] N82-28272
QUASARS
Astronomical Society information number 55. Report of the meeting --- conference
[ISSN-0374-1958] N82-29241
QUENCHING (COOLING)
The influence of solution treatment time and quench rate on microstructure and mechanical properties of high magnesium aluminum magnesium alloys
[AD-A113826] N82-28413
Investigation of corrosion and microstructural properties of high strength aluminum alloys after Jominy testing
[NLR-MP-81004-U] N82-28432

R

RADAR ANTENNAS
Near field antenna measurement system
[AD-A114125] N82-28522
RADAR EQUIPMENT
The development and application of the magnetron
[AD-A114155] N82-28560
RADAR MEASUREMENT
Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking
[NASA-TM-73298] N82-28690
RADAR RECEIVERS
A true logarithmic IF frequency amplifier for radar applications
[RSRE-MEMO-3400] N82-28504

RADAR SCATTERING
High-resolution radar sea scatter, experimental observations and discriminants
[AD-A113394] N82-28520
Experimental time-domain determination of complex resonances of simple objects --- radar scattering and target recognition
[AD-A113168] N82-28521
RADAR TARGETS
FACE-2 data reductions and analyses, prior to disclosure of the treatment decisions. Part 1: FACE-2 rain gage rainfall
[PB82-163056] N82-28926
RADAR TRANSMITTERS
Sensor technology
[FOA-C-30262-E1] N82-28613
RADIAL DISTRIBUTION
The radial variation of the ionization in a coaxial plasma gun operated under critical velocity conditions
[TRITA-EPP-81-07] N82-29195
RADIAL FLOW
Calibration and application of a combination temperature-pneumatic probe for velocity and rotor loss distribution measurements in a compressor
[AD-A113834] N82-28608
RADIANT FLUX DENSITY
Analysis of the atmospheric aerosol size distribution information retrievable from near-limb angular radiance measurements taken on Mauna Loa, Hawaii
[DE82-005999] N82-28851
RADIATION ABSORPTION
Spot spectroscopy: Local spectroscopic measurements within laser produced plasmas
[AD-A114165] N82-29180
RADIATION BELTS
Galactic radiation belts
[AD-A111836] N82-29244
RADIATION DAMAGE
Charged particle simulation of fast neutron damage
[AD-A107394] N82-29124
RADIATION DETECTORS
Fine-grained hodoscopes based on scintillating optical fibers
[DE82-006248] N82-29170
RADIATION DOSAGE
Design, fabrication, calibration, testing and satellite integration of a space radiation dosimeter
[AD-A113085] N82-28348
What is ALARA
[DE81-030814] N82-28995
Impact of a proposed change in the maximum permissible dose limit for neutrons to radiation-protection programs at DOE facilities
[DE82-001419] N82-29137
RADIATION EFFECTS
Long-term and progressive changes in Rhesus spectral sensitivity after low-level coherent light (514nm exposure) --- effects of laser exposure on visual function
[AD-A111639] N82-28946
RADIATION MEASUREMENT
Reports from the German Meteorological Service. Number 156: Statistics for the global radiation at eight stations of the German Meteorological Service
[ISSN-0072-4130] N82-28857
RADIATION MEASURING INSTRUMENTS
Fine-grained hodoscopes based on scintillating optical fibers
[DE82-006248] N82-29170
RADIATION PROTECTION
What is ALARA
[DE81-030814] N82-28995
Impact of a proposed change in the maximum permissible dose limit for neutrons to radiation-protection programs at DOE facilities
[DE82-001419] N82-29137
RADIATION SHIELDING
Design, fabrication, calibration, testing and satellite integration of a space radiation dosimeter
[AD-A113085] N82-28348
RADIATIVE RECOMBINATION
Numerical study of the Columbia high-beta device: Torus-2
[DE82-007363] N82-29187
RADIATIVE TRANSFER
Atmospheric transmittance/radiance computer code FASCOD2
[AD-A113825] N82-28859
RADICALS
Studies in chemical reactivity
[DE82-006891] N82-28407
Endor studies of radiation-produced trapped electrons and radicals in disordered systems and radical matrix interactions in polymers and on surfaces
[AD-A114321] N82-28455
RADIO ASTRONOMY
The first three years of IUE
[RL-81-091] N82-29242
Galactic radiation belts
[AD-A111836] N82-29244
Improved 35 GHz radiometer for solar burst measurements
[AD-A113139] N82-29256
RADIO BEACONS
Minimum operational performance standards for automatic direction finding (ADF) equipment
[RTCA/DO-179] N82-28270
RADIO DIRECTION FINDERS
Minimum operational performance standards for automatic direction finding (ADF) equipment
[RTCA/DO-179] N82-28270
RADIO EQUIPMENT
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523
RADIO FREQUENCY HEATING
The development and application of the magnetron
[AD-A114155] N82-28560
RF plasma sources for neutral-beam-injection systems. Phase 1: Definition study
[DE82-004193] N82-29182
RADIO NAVIGATION
Minimum operational performance standards for automatic direction finding (ADF) equipment
[RTCA/DO-179] N82-28270
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523
RADIO RELAY SYSTEMS
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report
[NASA-CR-169136] N82-28330
Introduction N82-28331
Earth Terminal Measurement System maintenance manual, addendum
[PB82-151994] N82-28544
RADIO WAVES
A numerical method for using a ray tracing program to compute radio fields in regions of strong focusing
[AD-A113913] N82-28509
RADIOACTIVE WASTES
Interpretation of time-domain electromagnetic soundings in the Calico Hills area, Nevada Test Site, Nye County, Nevada
[DE82-004260] N82-28869
Radon diffusion through multilayer earthen covers: Models and simulations
[DE82-001420] N82-29138
US Geological Survey research in radioactive waste disposal, fiscal year 1979
[USGS-CIRC-847] N82-29145
Monitoring technologies for ocean disposal of radioactive waste
[RAND/R-2773-NOAA] N82-29146
Non-US advanced low-level radwaste treatment systems
[DE82-900852] N82-29148
Nevada nuclear waste storage investigations
[DE82-005879] N82-29149
Nevada nuclear waste storage investigations
[DE82-004722] N82-29150
Long-term high-level defense waste technology
[DE82-005755] N82-29151
Deposition of highly active nuclear wastes
[TUM-LRT-TB-81/3] N82-29153
Future satellite carriers --- best choice for a carrier rocket for the 90's
[TUM-LRT-TB-81/6] N82-29248
RADIOBIOLOGY
Long-term and progressive changes in Rhesus spectral sensitivity after low-level coherent light (514nm exposure) --- effects of laser exposure on visual function
[AD-A111639] N82-28946
RADIOCHEMISTRY
Experimental nuclear and radiochemistry
[DE82-002925] N82-28402
RADIOGRAPHY
Dimensions/NBS, volume 65, number 7, September 1981
[PB82-158692] N82-29230
RADIOMETERS
Aerial radiological and photographic survey of eleven atolls and two islands within the Northern Marshall Islands. Dates of surveys, July-November 1978
[DE82-005584] N82-28752
RADIOMETRIC CORRECTION
Scanner imaging systems, aircraft N82-28715
RADIOMETRIC RESOLUTION
Navstar/Global Positioning System N82-28719
Misregistration's effects on classification and proportion estimation accuracy N82-28731
RADIOSONDES
Second International Ozone Sonde Intercomparison Conference, 5-20 April 1978
[ISSN-0012-4130] N82-28858
RADIOTELEPHONES
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report
[NASA-CR-169136] N82-28330
Introduction N82-28331
RADON
Radon diffusion through multilayer earthen covers: Models and simulations
[DE82-001420] N82-29138
RAIL TRANSPORTATION
The Transrapid test system in Emsland --- magnetic levitation railway
[MBB-543/81-O] N82-29237
RAILGUN ACCELERATORS
Analysis of a rail gun plasma accelerator
[AD-A114043] N82-29125
RAIN
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Randolph AFB, San Antonio, Texas. Parts A-F
[AD-A113704] N82-28887
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Atlantic City, New Jersey. Parts A-F
[AD-A113180] N82-28894
Fine scale structures in time and space of rainfall rate --- Sweden
[FOA-C-20448-E2] N82-28919
RAIN GAGES
FACE-2 data reductions and analyses, prior to disclosure of the treatment decisions. Part 1: FACE-2 rain gage rainfall
[PB82-163056] N82-28926
RAMAN SPECTROSCOPY
The use of a perfectly conducting sphere to excite the plasmon of a flat surface. 1: Calculation of the local field with applications to surface enhanced spectroscopy
[AD-A114278] N82-28384
Surface enhanced spectroscopy
[AD-A114274] N82-28385
A survey of some recent developments in laser Raman spectroscopy
[MQAD-TP-797] N82-28617
RANDOM ACCESS MEMORY
Electrical characterization of 64K dynamic rams
[AD-A113190] N82-28558
RANDOM NUMBERS
Portable random number generator for use in signal processing
[DE82-006831] N82-28532
RANDOM VARIABLES
Bending of a Ray in a random inhomogeneous medium
[PB82-148966] N82-28543
Finite birth-and-death models in randomly changing environments
[AD-A114188] N82-29102
RANGE (EXTREMES)
Impact of a proposed change in the maximum permissible dose limit for neutrons to radiation-protection programs at DOE facilities
[DE82-001419] N82-29137

RANGEFINDING
Baseline monitoring using aircraft laser ranging --- spaceborne laser simulation and aircraft laser tracking
[NASA-TM-73298] N82-28690
The two-way TDRSS observation model for the LSI-11/23 microcomputer
[NASA-TM-84793] N82-29029
RANGELANDS
USDA registration and rectification requirements N82-28708
RANGES (FACILITIES)
Unguided rocket safety: An informal compendium of range techniques for assuring safety in rocket testing
[AD-A113765] N82-28315
RANKINE CYCLE
The influence of the working fluid on a turbine and Rankine cycle design efficiency
[MBB-UR-535-82-O] N82-28652
RANKING
The ranking of displays based on transinformation — as a measure of tracking performance
[FB-52] N82-29001
Complete statistical ranking of populations, with tables and applications
[AD-A114400] N82-29098
RARE EARTH ELEMENTS
Coordination chemistry of several radius-sensitive complexones and applications to lanthanide-actinide separations
[DE82-005547] N82-28396
Preparation of rare earth doped YAG laser materials
[AD-A113608] N82-28623
Rare earth boride electron emitter materials fabrication and evaluation
[AD-A113807] N82-29203
RARE GAS-HALIDE LASERS
Design support of a rare gas halide laser
[AD-A112464] N82-28622
RARE GASES
Quantitative thermal desorption spectrometry of noble gases in solids N82-28369
Quantitative thermal description spectrometry of ionically implanted inert gases. 1: Fundamental aspects N82-28370
Quantitative thermal desorption spectrometry of ionically implanted inert gases. 2: Technical requirements N82-28371
RAREFIED GASES
Acoustic instabilities as a source of turbulence in reduced density channels
[AD-A114275] N82-28592
RATS
Mitotic activity and volume of epithelial cell nuclei of rat cornea following spaceflights in biosatellites N82-28965
Catecholamines and enzymes of their metabolism in rat myocardium after flight aboard the Cosmos-936 biosatellite N82-28966
Nitrogen compound levels in tissues of rat cerebral hemispheres and cerebellum after flight aboard Cosmos-1129 biosatellite N82-28967
RAWINSONDES
Summer MONEX US research flight missions, May - July 1979
[PB82-158718] N82-28923
RAY TRACING
A numerical method for using a ray tracing program to compute radio fields in regions of strong focusing
[AD-A113913] N82-28509
Electromagnetic wave trajectories at VHF and higher frequencies
[PB82-134289] N82-28538
Bending of a Ray in a random inhomogeneous medium
[PB82-148966] N82-28543
RAYLEIGH SCATTERING
Extinction by aerosol clouds of nonspherical particles at arbitrary wavelengths
[AD-A113535] N82-29163
RDX
TNT equivalency of Cyclotol 70/30
[AD-A113270] N82-28459
REACTION KINETICS
Gas-solid reactions. Part 1: External diffusion-controlled reactions
[AD-A114086] N82-28387
Kinetics of the reverse Deacon reaction
[DE82-005621] N82-28394
Experimental nuclear and radiochemistry
[DE82-002925] N82-28402
Application of solidification theory to rapid solidification processing
[AD-A112864] N82-28411
Super hydrides
[AD-A113229] N82-28449
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reacting flows
[NASA-CR-169124] N82-28576
Electron-beam sustained mercuric bromide laser study
[AD-A114246] N82-28634
Studies in energetic material dynamics
[AD-A114226] N82-29129
Molecular reaction rates
[AD-A114342] N82-29130
REACTION PRODUCTS
Fundamental studies in the conversion of coals to fuels of increased hydrogen content. Volume 1: The chemistry and mechanisms of coal conversion to clean fuel
[DE82-901287] N82-28472
REACTIVITY
Investigations on the nature and reactivity of compounds formed between lithium and carbon black
[AD-A113116] N82-28378
Properties of three-dimensional energetic solids and molecular crystals
[AD-A113764] N82-29205
REACTOR MATERIALS
Tokamaks with high-performance resistive magnets: Advanced test reactors and prospects for commercial applications
[DE82-007366] N82-29188
REACTOR SAFETY
Fundamental developments for quantitative acoustic emission measurements
[DE82-901315] N82-29114
REAL TIME OPERATION
Preliminary results of line sensor test
[AD-A114313] N82-28939
RECEIVERS
Earth Terminal Measurement System maintenance manual, addendum
[PB82-151994] N82-28544
REDUCED GRAVITY
Method of forming frozen spheres in a force-free drop tower
[NASA-CASE-NPO-14845-1] N82-28442
REDUCTION (CHEMISTRY)
A pyrometallurgical method for processing Ni-Cd scrap batteries
[PB82-145426] N82-28435
Super hydrides
[AD-A113229] N82-28449
REDUNDANCY
Reconfiguring redundancy management
[NASA-CASE-MSC-18498-1] N82-29013
Finite birth-and-death models in randomly changing environments
[AD-A114188] N82-29102
REENTRY EFFECTS
Preliminary analysis of STS-3 entry heat-transfer data for orbiter windward centerline
[NASA-TM-84500] N82-28575
REENTRY TRAJECTORIES
Space Shuttle flying qualities and flight control system assessment study
[NASA-CR-170391] N82-28300
Reconstruction of the 1st Space Shuttle (STS-1) entry trajectory
[NASA-CR-3561] N82-28313
REENTRY VEHICLES
Optimal alpha-beta filtering for tracking reentry vehicles from shipboard radars
[AD-A113076] N82-28314
Multipath analysis of telemetry support positions for APATS
[AD-A114057] N82-28342
REFLECTANCE
BRDF measurements of sunshield and baffle materials for the IRAS telescope
[NASA-TM-84235] N82-29155
REFLECTORS
Dual-shaped reflector design N82-28337
REFRACTIVITY
Bending of a Ray in a random inhomogeneous medium
[PB82-148966] N82-28543
An atmospheric refractive index fluctuation meter
[RSRE-MEMO-3433] N82-28856
The influence of the temperature coefficient of refractive index on a thermal imager
[RSRE-MEMO-3398] N82-29156
Extinction by aerosol clouds of nonspherical particles at arbitrary wavelengths
[AD-A113535] N82-29163
REFRACTOMETERS
An atmospheric refractive index fluctuation meter
[RSRE-MEMO-3433] N82-28856
REFRACTORY MATERIALS
Performance assessment of materials and components of the Westinghouse coal gasification process development unit
[DE82-005995] N82-28401
High temperature damping of dynamic systems N82-28661
REFRIGERATING
Technical options for reducing chlorofluorocarbon emissions
[RAND-R-2879-EPA] N82-28840
REFRIGERATING MACHINERY
An evaluation of strategies to control noise from air conditioning and refrigeration condensing units
[PB82-165903] N82-28496
REFUELING
An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994
REGENERATORS
Performance assessment of materials and components of the Westinghouse coal gasification process development unit
[DE82-005995] N82-28401
REGRESSION ANALYSIS
Analysis of Dense-Phase Fine-Coal Pneumatic Systems
[DE82-010243] N82-28759
REGULATIONS
A report of the technological aspects of regulatory-policy issues of geostationary platforms
[PB82-142191] N82-28540
Potential costs of complying with emission regulations for an indirect coal-liquefaction process
[DE82-001471] N82-28845
REINFORCEMENT RINGS
Buckling test of a 3-meter-diameter corrugated graphite-epoxy ring-stiffened cylinder
[NASA-TP-2032] N82-28665
REINFORCING FIBERS
Production of improved silicon carbide filaments for composite materials
[PB82-138256] N82-28366
Constitutive relations of randomly oriented steel fiber reinforced concrete under multiaxial compressive loadings
[AD-A114168] N82-28678
RELATIVISTIC PARTICLES
Compton effect in the SPS: Its application in beam profile measurement
[DE82-002534] N82-29136
Meson production in relativistic-heavy-ion collisions
[DE82-005652] N82-29141
RELATIVISTIC PLASMAS
The influence of a background plasma on the diocotron instability of a relativistic hollow electron beam
[AD-A113530] N82-29127
RELIABILITY
Study of the physics of insulating films as related to the reliability of metal oxide semiconductor (MOS) devices
[AD-A112501] N82-29201
RELIABILITY ANALYSIS
Reliability growth of continuous systems
[AD-A114099] N82-28658
RELIABILITY ENGINEERING
Reconfiguring redundancy management
[NASA-CASE-MSC-18498-1] N82-29013
REMOTE CONTROL
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291

Apparatus for releasably connecting first and second objects in predetermined space relationship
[NASA-CASE-MSC-18969-1] N82-28318

REMOTE SENSING
Method and apparatus for Delta K synthetic aperature radar measurement of ocean current
[NASA-CASE-NPO-15704-1] N82-28502
Earth Resources: A continuing bibliography with indexes, issue 33
[NASA-SP-7041(33)] N82-28695
Workshop rationale N82-28700
Registration and rectification needs of geology N82-28710
Oceanographic satellite remote sensing: Registration, rectification, and data integration requirements N82-28712
MLA imaging systems N82-28716
An experimental computer algorithm for seamount model parameter estimation based on SEASAT-A satellite radar altimetry
[AD-A113169] N82-28743
Feasibility of B spline data reduction on remote sensing data
[NLR-TR-80023-U] N82-28767
NORSEX: Total and multiyear ice concentration at Svalbard in September and October 1979, mapped by satellite microwave sensor at frequencies 37 GHz and 10 GHz
[PB82-160029] N82-28775
LANDSAT/NAVPAK system description and user's guide
[NASA-TM-84782] N82-29024

REMOTE SENSORS
Sensor technology
[FOA-C-30262-E1] N82-28613
Report of subpanel on image sharpness N82-28701
Data registration and integration requirements for severe storms research N82-28711

REMOTELY PILOTED VEHICLES
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291

RENDEZVOUS GUIDANCE
Apparatus for releasably connecting first and second objects in predetermined space relationship
[NASA-CASE-MSC-18969-1] N82-28318

RENE 41
Cryogenic performance of slotted brazed Rene 41 honeycomb panels
[NASA-CR-3525] N82-28664

RENE 95
Fatigue crack propagation thresholds for long and short cracks in Rene 95 nickel-base superalloy
[DE82-005135] N82-28422

REQUIREMENTS
Automated Orbit Determination System (AODS) requirements definition and analysis
[NASA-TM-84795] N82-29030

RESEARCH
United States Air Force Summer Faculty Research Program. 1981 Program Management report
[AD-A113707] N82-29259

RESEARCH AIRCRAFT
Summer MONEX US research flight missions, May - July 1979
[PB82-158718] N82-28923

RESEARCH AND DEVELOPMENT
Historical research and development inflation indices for Army fixed and rotor winged aircraft
[AD-A114368] N82-28290
Case studies of innovation in R and D planning
[DE82-901277] N82-29222

RESEARCH FACILITIES
Scientific and technical information output of the Langley Research Center for Calender year 1981
[NASA-TM-83270] N82-29225

RESEARCH MANAGEMENT
Preliminary analysis of technical risk and cost uncertainty in selected DARPA programs
[AD-A107402] N82-29218
Case studies of innovation in R and D planning
[DE82-901277] N82-29222
Realistic approach to the planning of high technology, high risk projects
[DE82-001049] N82-29223

RESERVOIRS
Water resources data for Alabama, water year 1980. Volume 1: Apalachicola Choctawatchee, Blackwater, Escambia, Perdido, and Alabama River Basins
[PB82-164112] N82-28777

RESIDENTIAL ENERGY
Residential-scale ice-storage system for space cooling
[DE82-000165] N82-28482
Computerized, Instrumented, Residential Analysis (CIRA)
[DE82-004560] N82-28484
Solar project description for Saddle Hill Trust: Lot 77, single family residence, Medway, Massachusetts
[DE82-003326] N82-28807
National solar data program performance results, volume 4
[DE82-002536] N82-28808
Summary of the Northstar home: An extension of the Solar 80 Program
[DE82-004688] N82-28817
Photovoltaics and electric utilities --- capital investment and revenue requirement
[DE82-006994] N82-28833
Weighting factors in the DOE-2 computer program
[DE81-028593] N82-29057

RESIN MATRIX COMPOSITES
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280
A semi-analytical model for laser-induced ablation of fibre resin composites
[MRL-R-844] N82-28354

RESOLUTION
Map accuracy requirements: The cartographic potential of satellite image data N82-28721

RESONANT FREQUENCIES
The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476
Damping in structural joints N82-28478

RESONANT VIBRATION
Arrangement for damping the resonance in a laser diode
[NASA-CASE-NPO-15980-1] N82-28618

RESONATORS
Electronically tunable phase locked loop oscillator
[AD-A113253] N82-28556

RESPIRATION
Human external respiration and gas exchange in acute period of adaptation to immersion in water N82-28959

RESPIRATORY RATE
Possible impairment of respiratory regulation under hyperbaric nitrogen narcosis N82-28964

RESPONSES
An analysis of solid propellant transient viscoelastic response under motor ignition conditions
[AD-A114345] N82-28467

RETICULOCYTES
Methodological aspects of testing erythrocyte balance by counting incubated reticulocytes N82-28972

RETORT PROCESSING
Oil shale and coal research FY 1980
[DE82-002825] N82-28751
Oil shale project large retort run summary run L-3
[DE82-005109] N82-28764

RETROFITTING
Effect of outside combustion air on gas furnace efficiency
[AD-A113484] N82-28377
Earth Terminal Measurement System maintenance manual, addendum
[PB82-151994] N82-28544

REVERSE OSMOSIS
Method for the preparation of thin-skinned asymmetric reverse osmosis membranes and products thereof
[NASA-CASE-ARC-11359-1] N82-28444

REVISIONS
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274

RHEOLOGY
Computer-aided injection molding system
[PB82-147810] N82-28490
Elastomechanical methods in the exploration of the Valles Caldera, New Mexico
[DE82-006923] N82-28766

RIBBONS
Low cost 2-D heatshield materials --- braided tapes
[AD-A113928] N82-28355

RIMS
A finite element stress analysis of spur gears including fillet radii and rim thickness effects
[NASA-TM-82865] N82-28646

RISK
Preliminary analysis of technical risk and cost uncertainty in selected DARPA programs
[AD-A107402] N82-29218
Realistic approach to the planning of high technology, high risk projects
[DE82-001049] N82-29223

RIVETED JOINTS
Evaluation and handbook data of 7050 rivets, volume 1
[AD-A113380] N82-28415

RIVETS
Evaluation and handbook data of 7050 rivets, volume 1
[AD-A113380] N82-28415

ROBUSTNESS (MATHEMATICS)
Robust comparison of three-dimensional shapes with an application to protein molecule configurations
[AD-A113786] N82-29050
Are robustness measures robust --- quantification and optimization of decision making in solving policy problems
[RAND/P-6734] N82-29073
Small sample properties of robust analysis of variance for fixed and random effects models
[AD-A113877] N82-29095

ROCKET ENGINE DESIGN
Rockets and astronautics. (Lexicon contribution)
[TUM-LRT-TB-81/11] N82-28352

ROCKET EXHAUST
Airglow imaging studies of natural and artificially induced ionospheric disturbances
[AD-A114369] N82-28866

ROCKET LAUNCHING
Unguided rocket safety: An informal compendium of range techniques for assuring safety in rocket testing
[AD-A113765] N82-28315

ROCKET NOSE CONES
The use of a deflectable nose on a missile as a control device
[AD-A112179] N82-28319

ROCKET OXIDIZERS
Inorganic halogen oxidizer research
[AD-A114196] N82-28382
Polycyclic high energy oxidizers
[AD-A112585] N82-28446

ROCKET TEST FACILITIES
Unguided rocket safety: An informal compendium of range techniques for assuring safety in rocket testing
[AD-A113765] N82-28315

ROCKY MOUNTAINS (NORTH AMERICA)
Regional assessment of aquifers for thermal energy storage. Volume 1: Regions 1 through 6
[DE82-002507] N82-28827

ROLLER BEARINGS
Advances in high-speed rolling-element bearings
[NASA-TM-82910] N82-28644

ROOM TEMPERATURE
Weighting factors in the DOE-2 computer program
[DE81-028593] N82-29057

ROTARY STABILITY
The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476
Current topics in rotordynamics research N82-28477

ROTARY WINGS
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252
Wind-tunnel evaluation of an aeroelastically conformable rotor
[AD-A114384] N82-28260
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-169131] N82-28282

ROTATING BODIES
The Shock and Vibration Digest, volume 14, no. 6 [AD-A115750] N82-28476
Seismic analysis of rotating mechanical systems. A review N82-28479
ROTOR AERODYNAMICS
Calculation of the unsteady pressure distribution on an oscillating cascade with thick profiles and steady turning angle [DFVLR-FB-81-38] N82-28600
Calibration and application of a combination temperature-pneumatic probe for velocity and rotor loss distribution measurements in a compressor [AD-A113834] N82-28608
ROTOR BLADES
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade [NASA-CR-169131] N82-28282
ROTOR BLADES (TURBOMACHINERY)
The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft [NASA-CR-137803] N82-28281
RUBBER
The effect of strain upon the velocity of sound and the velocity of free retraction for natural rubber [AD-A114238] N82-28453
Crack velocities in natural rubber [AD-A114298] N82-28677
RUNGE-KUTTA METHOD
On the contractivity region of Runge-Kutta methods [TRITA-NA-8106] N82-29093

S

S MATRIX THEORY
Schroedinger equation in the quantim field theory with nonlocal [JINR-E2-80-705] N82-29214
SAFETY
Environmental and radiological safety studies. Interaction of Pu-23802 heat sources with terrestrial and aquatic environments [DE82-004681] N82-28848
SAFETY FACTORS
Laboratory demonstration electromagnetic launcher: Preliminary hazard analysis [AD-A114154] N82-28524
A Rand note: Policy analysis of water management for the Netherlands. Volume 17: Flood safety model for the Ijssel Lakes --- dike safety [RAND/N-1500/17-NETH] N82-28693
SAFETY MANAGEMENT
Impact of a proposed change in the maximum permissible dose limit for neutrons to radiation-protection programs at DOE facilities [DE82-001419] N82-29137
SALINITY
Vertical sections of temperature, salinity, thermosteric anomaly and zonal geostrophic velocity from NORPAX shuttle experiment, part 1 [PB82-163106] N82-28944
SAMPLES
Small sample properties of robust analysis of variance for fixed and random effects models [AD-A113877] N82-29095
SAMPLING
A quantitative assessment of resampling errors N82-28728
Hydrogeochemical and stream sediment reconnaissance basic data for Ophir, Alaska [DE82-000851] N82-28753
Sampling frequency for water quality monitoring [PB82-145343] N82-28770
The basket method for selecting balanced samples. Part 2: Applications to price estimation [AD-A112949] N82-29096
Pre-configural polysampling pushback performance [AD-A114304] N82-29099
SATELLITE ANTENNAS
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report [NASA-CR-169136] N82-28330
Satellite system design N82-28333
The technology N82-28335
Cassegrain dual reflector antenna design --- MSAT UHF antenna N82-28336
Dual-shaped reflector design N82-28337
Multiple beam offset antenna design processes --- MSAT antenna N82-28340
SATELLITE ATTITUDE CONTROL
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report [NASA-CR-169136] N82-28330
The technology N82-28335
Spacecraft induced error sources N82-28718
LANDSAT/NAVPAK system description and user's guide [NASA-TM-84782] N82-29024
Systems Technology Laboratory (STL) library methods and procedures [NASA-TM-84787] N82-29032
SATELLITE CONTROL
Evaluation of the IMP-16 microprocessor orbit determination system filter [NASA-TM-84788] N82-29026
Mathematical specifications of the Onboard Navigation Package (ONPAC) simulator (revision 1) [NASA-TM-84797] N82-29033
SATELLITE DESIGN
Satellite system design N82-28333
SATELLITE NAVIGATION SYSTEMS
System architecture study of an orbital GPS user terminal [NASA-CR-166821] N82-28501
SATELLITE NETWORKS
Network specifications for a virtual space teleconferencing system [AD-A114119] N82-28530
SATELLITE OBSERVATION
Earth Resources: A continuing bibliography with indexes, issue 33 [NASA-SP-7041(33)] N82-28695
Oceanographic satellite remote sensing: Registration, rectification, and data integration requirements N82-28712
Scanner imaging systems, aircraft N82-28715
An automated mapping satellite system N82-28734
Conept for a multiple resolution pushbroom sensor N82-28735
SATELLITE ORBITS
Evaluation of the IMP-16 microprocessor orbit determination system filter [NASA-TM-84788] N82-29026
SATELLITE-BORNE INSTRUMENTS
Solar observations from the P78-1 satellite [AD-A112873] N82-29257
SATELLITE-BORNE PHOTOGRAPHY
The use of terrain height information for improving the accuracy of classification of LANDSAT data [RAE-TM-SPACE-297] N82-28696
SATURN (PLANET)
Pioneer 10/11 data analysis of the trapped radiation experiment [NASA-CR-166360] N82-28312
SCALE MODELS
Research model wing/tail fabrication --- transonic wind tunnel 1/7.5-scale model [AD-A114101] N82-28288
SCANNING
FORTRAN static source code analyzer (SAP) user's guide [NASA-TM-84786] N82-29021
SCATTERING CROSS SECTIONS
Theoretical investigation of absorptive processes [AD-A107278] N82-28507
Tables and graphs of photon-interaction cross sections from 0.1 keV to 100 MeV derived from the LLL evaluated-nuclear-data library [DE82-004819] N82-29139
SCENE ANALYSIS
Report of subpanel on feature extraction N82-28702
Current status of metric reduction of (passive) scanner data N82-28739
SCHEDULING
Aircraft and crew scheduling during airlift operations [AD-A114114] N82-29011
Virtual memory management [SU-SLAC-244] N82-29014
Study of increasing lead times in major weapon systems acquisition [AD-A113459] N82-29221
Traffic capacity through work zones on urban freeways [PB82-143009] N82-29239
SCHOTTKY DIODES
Method of Fabricating Schottky Barrier solar cell [NASA-CASE-NPO-13689-4] N82-28780
SCHROEDINGER EQUATION
Nonrelativistic gauge theories [DE81-700397] N82-29110
Schroedinger equation in the quantim field theory with nonlocal [JINR-E2-80-705] N82-29214
SCINTILLATION COUNTERS
Optical and in situ measuring of structure parameters relevant to temperature and humidity and their application to the measuring of sensible and latent heat flux --- atmospheric optics [AD-A114336] N82-28637
SCRAP
Process for recovering chromium and other metals from superalloy scrap [PB82-145418] N82-28436
SEA ICE
Boundary subroutine for the NCAR global climate model [PB82-158742] N82-28924
Users manual for polar ice forecast subsystem: Arctic [AD-A114351] N82-28932
Program maintenance manual polar ice forecast subsystem: Arctic [AD-A114343] N82-28933
SEA LEVEL
The annual variation of the large-scale 500 mb and sea level pressure fields [DM-35] N82-28918
SEA STATES
High-resolution radar sea scatter, experimental observations and discriminants [AD-A113394] N82-28520
SEA WATER
The role of microorganisms in marine corrosion processes [AD-A114424] N82-28386
Enhancement of the stability of common polymeric materials against undersea degradation [PB82-163015] N82-28458
Preliminary results of line sensor test [AD-A114313] N82-28939
SEAMOUNTS
An experimental computer algorithm for seamount model parameter estimation based on SEASAT-A satellite radar altimetry [AD-A113169] N82-28743
SEASAT-A SATELLITE
An experimental computer algorithm for seamount model parameter estimation based on SEASAT-A satellite radar altimetry [AD-A113169] N82-28743
SECONDARY EMISSION
Secondary electron yields of carbon-coated and polished stainless steel [DE82-012762] N82-28426
SEDIMENTS
A Rand note: Policy analysis of water management for the Netherlands. Volume 18: Sedimentation and dredging cost models [RAND/N-1500/18-NETH] N82-28694
Hydrogeochemical and stream sediment reconnaissance basic data for Sheridan quadrangle, Wyoming [DE82-002467] N82-28748
Hydrogeochemical and stream sediment reconnaissance basic data for Cheyenne quadrangle, Wyoming [DE82-000786] N82-28754
Hydrogeochemical and stream sediment reconnaissance basic data for Preston quadrangle, Wyoming; Idaho [DE82-000783] N82-28755
Hydrogeochemical and stream sediment reconnaissance basic data for Tularosa quadrangle, New Mexico [DE82-000787] N82-28756
Hydrogeochemical and stream sediment reconnaissance basic data for Silver City quadrangle, New Mexico; Arizona [DE82-000852] N82-28761

Hydrogeochemical and stream sediment reconnaissance basic data for Brownfield quadrangle, New Mexico; Texas
[DE82-000855] N82-28762
Hydrogeochemical and stream sediment reconnaissance basic data for Dallas NTMS quadrangle, Texas
[DE82-000856] N82-28763
Water resources data for West Virginia, water year 1980. Appendix: Coal areas
[PB82-159674] N82-28778

SEGMENTS
Image segmentation using simple Markov, field models
[AD-A112914] N82-29162

SEISMIC ENERGY
Terrestrial environment (climatic) criteria guidelines for use in aerospace vehicle development
[NASA-TM-82473] N82-28317

SEISMIC WAVES
The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476
Seismic analysis of rotating mechanical systems. A review N82-28479

SELECTION
The basket method for selecting balanced samples. Part 2: Applications to price estimation
[AD-A112949] N82-29096

SELF CONSISTENT FIELDS
An SCF-X alpha-SW molecular-orbital study of a possible reaction path for Ziegler-Natta catalysts
[AD-A113559] N82-28373

SEMICONDUCTOR DEVICES
Impact of advanced power semiconductor systems on utilities and industry
[DE82-901286] N82-28547
Experimental study of the thermodynamics of thin films and surfaces
[DE82-004887] N82-29215

SEMICONDUCTOR DIODES
Electrical characterization of silicon produced by electrochemical purification
[DE82-005105] N82-28398

SEMICONDUCTORS (MATERIALS)
Advanced electronic technology
[AD-A114319] N82-28563
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE82-004259] N82-28811

SENSITIVITY
High-order terms in sensitivity analysis through a differential approach
[LA-8813-MS] N82-29072

SENSORY PERCEPTION
Vibration and assessment of this flight factor by pilots N82-28976

SEPARATORS
High gradient magnetic separation applied to liquid-liquid separation
[PB82-142811] N82-28495
Lithium oxide in the Li(Si)/FeS2 thermal battery system
[DE82-005114] N82-28818
Acoustic particle separation
[NASA-CASE-NPO-15559-1] N82-29112
Development and construction of separator rods for the double circular guide system (DCS): Circular guide radii R1=0.05/0.75 mm; R2=0.04/0.025 mm
[MBB-UR-534-82-O] N82-29154

SEQUENCING
Complete statistical ranking of populations, with tables and applications
[AD-A114400] N82-29098

SEQUENTIAL CONTROL
Digital sequential solid-state relay tester
[DE82-004680] N82-28610

SERIES EXPANSION
Inverse of a Laplace transform and its numerical evaluation
[DE82-004667] N82-29085

SERVICE LIFE
Performance assessment of materials and components of the Westinghouse coal gasification process development unit
[DE82-005995] N82-28401
Finite birth-and-death models in randomly changing environments
[AD-A114188] N82-29102

SEX
Testosterone enhances C-14 2-deoxyglucose uptake by striated muscle --- sex hormones and muscle
[NASA-CR-169101] N82-28986

SHALE OIL
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
The effects of lease size on yields from oil shale surface mines
[RAND/N-1798-DOE] N82-28697
Oil shale and coal research FY 1980
[DE82-002825] N82-28751
Oil shale project large retort run summary run L-3
[DE82-005109] N82-28764

SHAPES
Robust comparison of three-dimensional shapes with an application to protein molecule configurations
[AD-A113786] N82-29050

SHEAR FLOW
Numerical simulation of wall-bounded turbulent shear flows
[NASA-TM-84259] N82-28577

SHEAR LAYERS
Research on augmentation of turbulent mixing
[AD-A114310] N82-28591

SHEAR PROPERTIES
Automated torsion pendulum: Control and data collection/reduction using a desktop computer
[AD-A113038] N82-28670

SHEAR STRENGTH
Evaluation and handbook data of 7050 rivets, volume 1
[AD-A113380] N82-28415

SHEAR STRESS
Wall layer structure and drag reduction: Role of vicous sublayer
[AD-A112980] N82-28581
Measurement methods for fluid shear stress
[AD-A113020] N82-28582

SHEEP
The biological effects of repeated blasts
[AD-A113113] N82-28990

SHELTERS
Evaluation of applicability of standard CW EMI/RFI shielding effectiveness test techniques to assessment of EMP hardness of tactical shelters
[AD-A113042] N82-28517
An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994

SHIELDING
What is ALARA
[DE81-030814] N82-28995

SHIPS
Optimal alpha-beta filtering for tracking reentry vehicles from shipboard radars
[AD-A113076] N82-28314

SHOCK FRONTS
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292

SHOCK TESTS
The shock and vibration digest, volume 14, no. 4
[AD-A114448] N82-28673
The changing dimensions of qualification testing N82-28674

SHOCK WAVES
Attenuation of large amplitude pressure disturbances by liquid droplets
[AD-A114250] N82-28636

SIGNAL ANALYSIS
Applied stress determination using computerized ultrasonic techniques
[DE82-003894] N82-28681
Classification of data sets
[BMVG-FBWT-80-17] N82-29103

SIGNAL DETECTION
CO2 laser photoacoustic detection of hydrazine based rocket fuels
[AD-A112950] N82-28632

SIGNAL PROCESSING
Experimental time-domain determination of complex resonances of simple objects --- radar scattering and target recognition
[AD-A113168] N82-28521
Portable random number generator for use in signal processing
[DE82-006831] N82-28532
Reconfiguring redundancy management
[NASA-CASE-MSC-18498-1] N82-29013
Polynomial signals and polynomial transformations
[FUB-28-1981] N82-29066
Fitting a polynomial to data in the presence of noise
[AD-A112984] N82-29081
Fundamentals of number theory and polynominals algebra for numerical signal processing
[FUB-27-1981] N82-29087

SIGNAL STABILIZATION
Method and apparatus for transfer function simulator for testing complex systems
[NASA-CASE-NPO-15696-1] N82-28619

SIGNAL TO NOISE RATIOS
Intermodulation analysis --- MSAT antenna N82-28339
Nonparametric estimation of signals mixed with noise
[AD-A113018] N82-28514

SILANES
Chemical reactions and properties of organosilicon compounds related to new materials
[AD-A114377] N82-28451
Measurement and use of the plasma current waveform in an RF silane discharge
[DE82-005119] N82-28566

SILICON
Method of protecting a surface with a silicon-slurry/aluminide coating --- coatings for gas turbine engine blades and vanes
[NASA-CASE-LEW-13343-1] N82-28441
Atmospheric effects on solar-cell calibration and evaluation
[DE82-007370] N82-28825
Structural and electronic studies of defects in amorphous silicon
[DE82-004477] N82-29213

SILICON CARBIDES
Production of improved silicon carbide filaments for composite materials
[PB82-138256] N82-28366

SILICON DIOXIDE
Ultra-lightweight mirror manufacturing and radiation response study
[AD-A106998] N82-29157

SILICON POLYMERS
Chemical reactions and properties of organosilicon compounds related to new materials
[AD-A114377] N82-28451

SILVER
Silver-doping effects and photostructural transformation in evaporated As2S3 thin films
[AD-A113148] N82-28375

SIMPLEX METHOD
Handling artificial variables in a simplex method. A commentary
[AD-A114133] N82-29105

SIMULATION
Laboratory-scale simulation of underground coal gasification: Experiment and theory
[DE82-001063] N82-28470
The 10th IFIP Conference on System Modeling and Optimization
[AD-A113126] N82-29104

SIMULATORS
Six-degree-of-freedom (6-DOF) simulator for weapon testing
[AD-A113536] N82-28308

SINGLE CRYSTALS
Initial stages of oxidation on single crystals of lithium hydride interaction between single crystal lithium hydride and a stainless steel, high vacuum container
[DE82-005614] N82-29212

SINTERING
Processing and properties of Zn0 based varistors
[DE82-005583] N82-28565

Sinterable powders from laser driven reactions
[AD-A11[illegible]062] N82-28628
SITE SELECTION
Passive-solar construction handbook
[DE82-002455] N82-28483
The effects of lease size on yields from oil shale surface mines
[RAND/N-1798-DOE] N82-28697
Small hydro-electric resource assessment: Hauraki area
[DE82-901428] N82-28757
Development of slide program describing site-selection process for Small Wind Energy Conversion Systems (SWECS)
[DE82-006209] N82-28831
SIZE (DIMENSIONS)
The optimal design of involute gear teeth with unequal addenda
[NASA-TM-82866] N82-28645
SIZE DETERMINATION
Preliminary sizing of vibration absorber for space mast structures
[NASA-TM-84488] N82-28346
SKIN (STRUCTURAL MEMBER)
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280
SLEEP
Sleep, circadian cycles of physiological functions and parameters of human work capacity on first day after changing from altered to usual sleep-waking cycle
N82-28951
SLENDER WINGS
The attached flow over a slender delta wing with leading-edge flaps
[RAE-TR-81150] N82-28254
SLICING
Improved ingot slicing machine
[NASA-CASE-NPO-15483-1] N82-28642
SLIDING
Analysis of continuous beams with joint slip
[AD-A107112] N82-28669
SLIDING FRICTION
The dryout region in frictionally heated sliding contacts
[NASA-TM-82796] N82-28574
SLOPES
Occurrences of the polar slant E condition (SEC) at Narssarssuaq, Godhavn, Thule, Denmark for 1980
N82-28873
SLOT ANTENNAS
A 20 GHz circularly polarized, fan beam slot array antenna
[AD-A114291] N82-28525
SLOTS
Cryogenic performance of slotted brazed Rene 41 honeycomb panels
[NASA-CR-3525] N82-28664
SLOTTED WIND TUNNELS
Measuring the flow properties of slotted test-section walls
[FFA-135] N82-28571
SLUDGE
Integration of processes for wastewater residuals management
[PB82-147992] N82-28854
SMALL PERTURBATION FLOW
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263
SMOKE ABATEMENT
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268
SNOW
Comparison of theoretical and actual satellite microwave brightness temperatures to determine snowpack properties
[PB82-161118] N82-28774
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Randolph AFB, San Antonio, Texas. Parts A-F
[AD-A113704] N82-28887
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Atlantic City, New Jersey. Parts A-F
[AD-A113180] N82-28894
Boundary subroutine for the NCAR global climate model
[PB82-158742] N82-28924
SNOW COVER
Snow barrier potential for harvesting moisture in transects across Chinook areas in Montana
[PB82-157926] N82-28771
Comparison of theoretical and actual satellite microwave brightness temperatures to determine snowpack properties
[PB82-161118] N82-28774
Environmental satellite imagery, July 1981
[PN82-156894] N82-28922
SOCIAL FACTORS
Natural and social determination of human psyche
N82-28983
SODIUM
Thermal properties of metallic sodium near melt from molecular dynamics calculations
[DE81-030307] N82-29132
SODIUM CHLORIDES
The effect of heat transfer on the diffusion-limited cathodic reduction of oxygen on steel in flowing 3.2 percent sodium chloride solution
[NPL-DMA(A)-38] N82-28410
Sampling frequency for water quality monitoring
[PB82-145343] N82-28770
SODIUM HYDROXIDES
Rapidly-refuelable 167-CM(2) aluminum-air power cell
[DE82-006251] N82-28826
SOIL MECHANICS
Two-dimensional hybrid modelling of soil-structure interaction
[PB82-142118] N82-28489
SOIL MOISTURE
Snow barrier potential for harvesting moisture in transects across Chinook areas in Montana
[PB82-157926] N82-28771
Boundary subroutine for the NCAR global climate model
[PB82-158742] N82-28924
SOLAR ARRAYS
Analytical modeling of spacecraft power systems
[NASA-CR-166820] N82-28349
Design studies for concentrating photovoltaic arrays
[DE82-005113] N82-28812
Intermediate photovoltaic system application experiment operational performance report. Volume 4: Mt. Laguna Radar Station, Mt. Laguna, Calif.
[DE82-007565] N82-28835
Intermediate photovoltaic system application experiment operational performance report. Volume 5: Newman Power Station Site, El Paso, Tex.
[DE82-007566] N82-28836
SOLAR CELLS
Electrical characterization of silicon produced by electrochemical purification
[DE82-005105] N82-28398
Method of Fabricating Schottky Barrier solar cell
[NASA-CASE-NPO-13689-4] N82-28780
Design handbook for photovoltaic power systems. Volume 1: Simplified methods for utility interconnected systems
[DE82-003108] N82-28810
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE82-004259] N82-28811
Evaluation of thick-file inks for solar cell grid metallization
[DE82-005615] N82-28814
Atmospheric effects on solar-cell calibration and evaluation
[DE82-007370] N82-28825
Intermediate photovoltaic system application experiment operational performance report. Volume 4: Mt. Laguna Radar Station, Mt. Laguna, Calif.
[DE82-007565] N82-28835
Intermediate photovoltaic system application experiment operational performance report. Volume 5: Newman Power Station Site, El Paso, Tex.
[DE82-007566] N82-28836
SOLAR COLLECTORS
Engineering development studies for integrated evacuated CPC arrays
[DE82-005676] N82-28568
Solar concentrator protective system
[NASA-CASE-NPO-15662-1] N82-28785
New look at long-term collector performance and utilizability
[DE82-005259] N82-28799
Dynamic analysis and simulation of a large scale thermal simulator
[DE82-005588] N82-28802
Design and validation of a thermal simulator for solar system performance testing
[DE82-005589] N82-28803
Economic analysis based on land costs of collector spacing in a collector field
[DE82-004519] N82-28820
Fundamentals and techniques of nonimaging optics for solar-energy concentration
[DE82-004885] N82-28830
SOLAR COOLING
Passive-solar construction handbook
[DE82-002455] N82-28483
SOLAR ENERGY
Passive-solar construction handbook
[DE82-002455] N82-28483
Thermal and economic analysis of solar-assisted heat pumps for low-temperature IPH applications
[DE82-006185] N82-28805
National solar data program performance results, volume 4
[DE82-002536] N82-28808
Environmental data for sites in the National Solar Data Network, October 1981
[DE82-002706] N82-28850
SOLAR ENERGY CONVERSION
Wind and solar powered turbine
[NASA-CASE-NPO-15496-1] N82-28784
Advanced solar energy research program
[DE82-004791] N82-28813
SOLAR FLARES
Improved 35 GHz radiometer for solar burst measurements
[AD-A113139] N82-29256
SOLAR FURNACES
Rotary kiln for the solar decomposition of zinc sulfate
[DE82-004323] N82-28804
SOLAR GENERATORS
Wind and solar powered turbine
[NASA-CASE-NPO-15496-1] N82-28784
SOLAR HEATING
[illegible]ant design and economic analysis for solar coal gasification
[DE82-003178] N82-28468
Design and validation of a thermal simulator for solar system performance testing
[DE82-005589] N82-28803
Solar energy system performance evaluation: Summerwood Associates, House G, Old Saybrook, connecticut, June 1980 - May 1981
[DE82-004408] N82-28806
Solar project description for Saddle Hill Trust: Lot 77, single family residence, Medway, Massachusetts
[DE82-003326] N82-28807
SOLAR HOUSES
Summary of the Northstar home: An extension of the Solar 80 Program
[DE82-004688] N82-28817
SOLAR MAGNETIC FIELD
Solar wind magnetic field penetration into cometary ionospheres
[REPT-685] N82-29254
SOLAR PHYSICS
The 1981 summer study program in geophysical fluid dynamics at the Woods Hole Oceanographic Institution physics of convection
[AD-A114366] N82-28590
SOLAR RADIATION
Solar concentrator protective system
[NASA-CASE-NPO-15662-1] N82-28785
Reports from the German Meteorological Service. Number 156: Statistics for the global radiation at eight stations of the German Meteorological Service
[ISSN-0072-4130] N82-28857
Synchronization of cardiovascular accidents with physical clocks N82-28956
SOLAR RADIO BURSTS
Improved 35 GHz radiometer for solar burst measurements
[AD-A113139] N82-29256
SOLAR SENSORS
Autonomous onboard attitude determination system specifications and requirements
[NASA-TM-84800] N82-29056

SOLAR SPECTRA
Rotational analysis of the red system of C-13N-14. Part 2: Wave numbers, term values and constants
[USIP-81-11] N82-29258
SOLAR SYSTEM
Activities report of the Institute for Extraterrestrial Physics
[MPI-PAE/EXTRATERR-172] N82-29245
SOLAR WIND
Solar wind magnetic field penetration into cometary ionospheres
[REPT-685] N82-29254
SOLAR X-RAYS
Solar observations from the P78-1 satellite
[AD-A112873] N82-29257
SOLDERED JOINTS
Trend inspection station for printed circuit board soler joints, ultrasonic subsystem
[AD-A112918] N82-28655
SOLENOID VALVES
Environmental chamber low temperature cutoff
[DE82-007626] N82-28316
SOLID PROPELLANT IGNITION
An analysis of solid propellant transient viscoelastic response under motor ignition conditions
[AD-A114345] N82-28467
SOLID PROPELLANTS
An analysis of solid propellant transient viscoelastic response under motor ignition conditions
[AD-A114345] N82-28467
SOLID ROCKET PROPELLANTS
Rockets and astronautics. (Lexicon contribution)
[TUM-LRT-TB-81/11] N82-28352
SOLID STATE
Study of hydrogen in coals, polymers, oxides, and muscle water by nuclear magnetic resonance: Extension of solid state high resolution techniques
[DE82-005454] N82-28395
SOLID STATE DEVICES
Design, fabrication, calibration, testing and satellite integration of a space radiation dosimeter
[AD-A113085] N82-28348
Hermetically sealable package for hybrid solid-state electronic devices and the like
[NASA-CASE-MSC-20181-1] N82-28549
Advanced electronic technology
[AD-A114319] N82-28563
MLA imaging systems N82-28716
Solid state research
[AD-A114189] N82-29209
SOLID SURFACES
Characterization of solids and surfaces using ion beams and mass spectrometry
[AD-A112904] N82-28376
SOLID WASTES
Energy and solid/hazardous waste
[DE82-006964] N82-29152
SOLIDIFICATION
Application of solidification theory to rapid solidification processing
[AD-A112864] N82-28411
SOLIDS
Characterization of solids and surfaces using ion beams and mass spectrometry
[AD-A112904] N82-28376
Properties of three-dimensional energetic solids and molecular crystals
[AD-A113764] N82-29205
SOLUBILITY
Octanol/water partition coefficients and aqueous solubilities of organic compounds
[PB82-141797] N82-28408
Method for the preparation of thin-skinned asymmetric reverse osmosis membranes and products thereof
[NASA-CASE-ARC-11359-1] N82-28444
SOLVENT REFINED COAL
Recent progress in major coal liquefaction facilities: Overview Report No. 2
[DE82-004656] N82-28400
Fundamental studies in the conversion of coals to fuels of increased hydrogen content. Volume 1: The chemistry and mechanisms of coal conversion to clean fuel
[DE82-901287] N82-28472
SOLVENTS
Recent progress in major coal liquefaction facilities: Overview Report No. 2
[DE82-004656] N82-28400
Fundamental studies in the conversion of coals to fuels of increased hydrogen content. Volume 1: The chemistry and mechanisms of coal conversion to clean fuel
[DE82-901287] N82-28472
Technical options for reducing chlorofluorocarbon emissions
[RAND-R-2879-EPA] N82-28840
SONDES
A PCM encoder for balloon sondes
[INW-8102] N82-28344
SONOBUOYS
Underwater power source study
[AD-A112644] N82-28792
SOUND FIELDS
Calculation procedure for sound propagation in a multisectional duct with uniform flow
[NLR-TR-79111-U] N82-29119
SOUND LOCALIZATION
CO2 laser photoacoustic detection of hydrazine based rocket fuels
[AD-A112950] N82-28632
SOUND PRESSURE
The effect of strain upon the velocity of sound and the velocity of free retraction for natural rubber
[AD-A114238] N82-28453
SOUND TRANSMISSION
Geology related to acoustic transmission: Eastern Caribbean
[AD-A114430] N82-28938
Measurement of sound power flow in bending waves along pipes. Part 2: Influence of a near field on measurements with two accelerometers
[TPD-008-785/1] N82-29117
SOUND WAVES
Acoustic particle separation
[NASA-CASE-NPO-15559-1] N82-29112
Properties of materials using acoustic waves
[AD-A114124] N82-29113
SOUNDING
The choice of a laser for airborne depth sounding
[AD-A112901] N82-28629
Evaluation of the performance of a laser for airborne depth sounding
[AD-A112907] N82-28630
Laser hydrography in Australia
[AD-A113584] N82-28741
SOUTH DAKOTA
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 1
[DE82-005544] N82-28744
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745
SOUTH KOREA
Terminal forecast reference notebook, Osan AB, Korea
[AD-A107433] N82-28882
Terminal forcast reference notebook, Camp Casey, Korea
[AD-A107432] N82-28883
SOUTHERN CALIFORNIA
S-band radar pulse densities in the Los Angeles area
[AD-A114116] N82-28529
SPACE CHARGE
Injection space charge: Enlargements of flux density functioning point choice
[DE82-002299] N82-29131
Plasmas in particle accelerators: A hydrodynamic model of three-dimensional electrostatic instabilities
[DE82-006182] N82-29186
SPACE COMMUNICATION
A report of the technological aspects of regulatory-policy issues of geostationary platforms
[PB82-142191] N82-28540
SPACE COOLING (BUILDINGS)
Residential-scale ice-storage system for space cooling
[DE82-000165] N82-28482
SPACE FLIGHT FEEDING
Evaluation of engineering foods for closed Ecological Life Support System (CELSS)
[NASA-CR-167626] N82-29003
Nutrition and food technology for a Controlled Ecological Life Support System (CELSS)
[NASA-CR-167392] N82-29004
Evaluation of engineering foods for Controlled Ecological Life Support Systems (CELSS)
[NASA-CR-166359] N82-29006
SPACE FLIGHT STRESS
USSR report. Space biology and aerospace medicine, volume 16, no. 3, May - June 1982
[JPRS-81197] N82-28949
Dynamics of left ventricular systolic phase structure during long-term (140-185 days) spaceflights N82-28954
SPACE HEATING (BUILDINGS)
Preliminary conceptual design for geothermal space heating conversion of school district 50 joint facilities at Pagosa Springs, Colorado. GTA report no. 6
[DE82-005245] N82-28800
Solar energy system performance evaluation: Summerwood Associates, House G, Old Saybrook, connecticut, June 1980 - May 1981
[DE82-004408] N82-28806
National solar data program performance results, volume 4
[DE82-002536] N82-28808
SPACE MAINTENANCE
Spray applicator for spraying coatings and other fluids in space
[NASA-CASE-MSC-18852-1] N82-28640
SPACE NAVIGATION
System architecture study of an orbital GPS user terminal
[NASA-CR-166821] N82-28501
Mathematical specifications of the Onboard Navigation Package (ONPAC) simulator (revision 1)
[NASA-TM-84797] N82-29033
GPSPAC/LANDSAT-D Interface (GLI) system user's guide
[NASA-TM-84784] N82-29038
System description for the Global Positioning Subsystem Experiment Package (GPSPAC) Experiment Data Preprocessor (GEDAP)
[NASA-TM-84785] N82-29039
SPACE RENDEZVOUS
Apparatus for releasably connecting first and second objects in predetermined space relationship
[NASA-CASE-MSC-18969-1] N82-28318
SPACE SHUTTLE ORBITERS
Space Shuttle flying qualities and flight control system assessment study
[NASA-CR-170391] N82-28300
Reconstruction of the 1st Space Shuttle (STS-1) entry trajectory
[NASA-CR-3561] N82-28313
Preliminary analysis of STS-3 entry heat-transfer data for orbiter windward centerline
[NASA-TM-84500] N82-28575
SPACE SHUTTLE PAYLOADS
Micro-g triaxial piezoelectric satellite accelerometer system development
[AD-A113849] N82-28347
SPACE SHUTTLES
Third test flight of shuttle (STS-3)
[NASA-EB-82-4] N82-28323
SD/LDEF technical User's Manual
[AD-A113504] N82-28324
A bivariate gamma probability distribution with application to gust modeling --- for the ascent flight of the space shuttle
[NASA-TM-82483] N82-29094
SPACE SURVEILLANCE (GROUND BASED)
Fine resolution imaging of space objects
[AD-A113911] N82-29160
SPACE TRANSPORTATION SYSTEM 1 FLIGHT
Reconstruction of the 1st Space Shuttle (STS-1) entry trajectory
[NASA-CR-3561] N82-28313
SPACE TRANSPORTATION SYSTEM 3 FLIGHT
Third test flight of shuttle (STS-3)
[NASA-EB-82-4] N82-28323
Preliminary analysis of STS-3 entry heat-transfer data for orbiter windward centerline
[NASA-TM-84500] N82-28575
SPACEBORNE EXPERIMENTS
NASA report to educators, volume 10, no. 1 N82-29216
Definition phase effort of the Spacelab-2 Infrared Telescope Experiment (IRT)
[NASA-CR-170424] N82-29243
SPACECRAFT COMMUNICATION
Dielectric lens antenna for EHF airborne satellite communication terminals
[AD-A113250] N82-28515

SPACECRAFT CONTROL
Algorithms for autonomous star identification
[NASA-TM-84789] N82-29031
Autonomous onboard attitude determination system specifications and requirements
[NASA-TM-84800] N82-29056
Autonomous scheduling technology for Earth orbital missions
[NASA-CR-168939] N82-29217
SPACECRAFT DESIGN
LMSS telecommunication network design N82-28327
Future satellite carriers --- best choice for a carrier rocket for the 90's
[TUM-LRT-TB-81/6] N82-29248
SPACECRAFT DOCKING
Apparatus for releasably connecting first and second objects in predetermined space relationship
[NASA-CASE-MSC-18969-1] N82-28318
SPACECRAFT GUIDANCE
Rockets and astronautics. (Lexicon contribution)
[TUM-LRT-TB-81/11] N82-28352
SPACECRAFT LAUNCHING
A bivariate gamma probability distribution with application to gust modeling --- for the ascent flight of the space shuttle
[NASA-TM-82483] N82-29094
SPACECRAFT POWER SUPPLIES
Analytical modeling of spacecraft power systems
[NASA-CR-166820] N82-28349
SPACELAB PAYLOADS
Study of low energy electron flux and its reaction to active experimentation on Spacelab --- development of electronic units
[INW-8101] N82-28612
Definition phase effort of the Spacelab-2 Infrared Telescope Experiment (IRT)
[NASA-CR-170424] N82-29243
SPACETENNAS
Preliminary sizing of vibration absorber for space mast structures
[NASA-TM-84488] N82-28346
SPARK GAPS
Stability of a 100-kV self-firing spark gap
[DE82-005718] N82-28570
SPATIAL DISTRIBUTION
Economic analysis based on land costs of collector spacing in a collector field
[DE82-004519] N82-28820
SPATIAL RESOLUTION
Report of subpanel on image sharpness N82-28701
Conept for a multiple resolution pushbroom sensor N82-28735
SPECIFICATIONS
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
Autonomous onboard attitude determination system specifications and requirements
[NASA-TM-84800] N82-29056
SPECTRAL BANDS
Conept for a multiple resolution pushbroom sensor N82-28735
SPECTRAL RECONNAISSANCE
Earth Resources: A continuing bibliography with indexes, issue 33
[NASA-SP-7041(33)] N82-28695
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 1
[DE82-005544] N82-28744
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745
Airborne gamma-ray spectrometer and magnetometer survey, New Rockford quadrangle, North Dakota
[DE82-005535] N82-28746
Airborne gamma-ray spectrometer and magnetometer survey: Crescent quadrangle, Burns quadrangle, Canyon City quadrangle, Bend quadrangle, Salem quadrangle (Oregon)
[DE81-029063] N82-28749
Airborne gamma-ray spectrometer and magnetometer survey Coos Bay, Oregon, volume 1
[DE82-005534] N82-28750
SPECTRAL RESOLUTION
Thematic mapper performance N82-28714
Conept for a multiple resolution pushbroom sensor N82-28735
SPECTRAL SENSITIVITY
Long-term and progressive changes in Rhesus spectral sensitivity after low-level coherent light (514nm exposure) --- effects of laser exposure on visual function
[AD-A111639] N82-28946
SPECTRAL SIGNATURES
Modeling misregistration and related effects on multispectral classification N82-28733
SPECTROHELIOGRAPHS
Evolutionary charts of solar activity (calcium plages) as functions of heliographic longitude and time
[UAG-81] N82-29255
Solar observations from the P78-1 satellite
[AD-A112873] N82-29257
SPECTROMETERS
A Fourier transform spectrometer for visible and near ultra-violet measurements of atmospheric absorption
[NASA-TM-73297] N82-28606
Study of low energy electron flux and its reaction to active experimentation on Spacelab --- development of electronic units
[INW-8101] N82-28612
User's guide for the Total-Ozone Mapping Spectrometer (TOMS) instrument first year ozone T data set
[NASA-RP-1096] N82-28880
SPECTROPHOTOMETRY
Kinetic studies of organochromium (3) cations and their hydrido analog
[DE82-005581] N82-28397
SPECTROSCOPIC ANALYSIS
Quantitative thermal desorption spectrometry of noble gases in solids N82-28369
Quantitative thermal description spectrometry of ionically implanted inert gases. 1: Fundamental aspects N82-28370
Quantitative thermal desorption spectrometry of ionically implanted inert gases. 2: Technical requirements N82-28371
Acquisition and performance evaluation of a quadrupole mass spectrometer in a mobile laboratory --- for isotopic analysis
[DE82-004668] N82-28611
SPECTROSCOPY
Study of hydrogen in coals, polymers, oxides, and muscle water by nuclear magnetic resonance: Extension of solid state high resolution techniques
[DE82-005454] N82-28395
Hydrogeochemical and stream sediment reconnaissance basic data for Aztec Qaudrangle, New Mexico
[DE82-000853] N82-28760
SPECTRUM ANALYSIS
Maximum likelihood spectral estimation and its application of narrowband speech coding
[AD-A114070] N82-28513
High speed SAW spectrum analyser data handling --- surface acoustic wave (SAW)
[RSRE-MEMO-3450] N82-28546
Radiation from high temperature plasmas
[AD-A113597] N82-29177
Rotational analysis of the red system of C-13N-14. Part 2: Wave numbers, term values and constants
[USIP-81-11] N82-29258
SPEECH BASEBAND COMPRESSION
Computer-generated speech
[DE82-004672] N82-29063
SPEED INDICATORS
Study of boundary-layer transition using transonic cone Preston tube data
[NASA-CR-169130] N82-28579
SPHERES
Method of forming frozen spheres in a force-free drop tower
[NASA-CASE-NPO-14845-1] N82-28442
SPIN-LATTICE RELAXATION
Study of correlations in molecular motion by multiple quantum NMR
[DE82-005650] N82-29144
Structural and electronic studies of defects in amorphous silicon
[DE82-004477] N82-29213
SPLINE FUNCTIONS
Feasibility of B spline data reduction on remote sensing data
[NLR-TR-80023-U] N82-28767
SPRAYED COATINGS
Spray applicator for spraying coatings and other fluids in space
[NASA-CASE-MSC-18852-1] N82-28640
SPRAYERS
Spray applicator for spraying coatings and other fluids in space
[NASA-CASE-MSC-18852-1] N82-28640
SPRAYING
A numerical investigation of the dynamics of liquid spray
[AD-A113378] N82-28586
SPUTTERING
Ion beam sputter deposited diamond like films
[NASA-TM-82873] N82-28445
STABILITY
Stability of a 100-kV self-firing spark gap
[DE82-005718] N82-28570
STABILITY DERIVATIVES
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252
STAINLESS STEELS
A study of the breakdown mechanism of AISI 304 stainless steel, type 2024 aluminum and various titanium coatings
[AD-A113831] N82-28414
Secondary electron yields of carbon-coated and polished stainless steel
[DE82-012762] N82-28426
Comparison of laser welds in two stainless steels
[DE82-004699] N82-28651
Initial stages of oxidation on single crystals of lithium hydride interaction between single crystal lithium hydride and a stainless steel, high vacuum container
[DE82-005614] N82-29212
STANDARD DEVIATION
Reports from the German Meteorological Service. Number 156: Statistics for the global radiation at eight stations of the German Meteorological Service
[ISSN-0072-4130] N82-28857
STANDARDS
Minimum operational performance standards for automatic direction finding (ADF) equipment
[RTCA/DO-179] N82-28270
Map accuracy requirements: The cartographic potential of satellite image data N82-28721
What is ALARA
[DE81-030814] N82-28995
Development of a methodology for assessing aircrew workloads
[AD-A114364] N82-29010
STANDING WAVES
Acoustic particle separation
[NASA-CASE-NPO-15559-1] N82-29112
STAR CLUSTERS
Astronomical Society information number 55. Report of the meeting --- conference
[ISSN-0374-1958] N82-29241
STAR TRACKERS
Algorithms for autonomous star identification
[NASA-TM-84789] N82-29031
Autonomous onboard attitude determination system specifications and requirements
[NASA-TM-84800] N82-29056
STATIC AERODYNAMIC CHARACTERISTICS
Methodology for determining elevon deflections to trim and maneuver the DAST vehicle with negative static margin
[NASA-TM-84499] N82-28299
STATIC LOADS
External loads on nozzles in cylindrical shells
[CRIF-MT-146] N82-28687
STATIC PRESSURE
Influence of surface static-pressure orifices on boundary-layer transition --- tests conducted in the Langley Low-Turbulence Pressure Tunnel
[NASA-TM-84492] N82-28248

STATIONARY ORBITS
Land Mobile Satellite Service N82-28326
MSAT design N82-28328
STATISTICAL ANALYSIS
Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations
[AD-A113672] N82-28841
Circulation statics for the extratropical Northern Hemisphere based on NMC analyses
[PB82-158759] N82-28925
FORTRAN static source code analyzer (SAP) user's guide
[NASA-TM-84786] N82-29021
FORTRAN static source code analyzer program (SAP) user's guide, revision 1
[NASA-TM-84791] N82-29041
The basket method for selecting balanced samples. Part 2: Applications to price estimation
[AD-A112949] N82-29096
Khincin-Kullback-Leibler estimation with inequality constraints
[AD-A114326] N82-29101
Preliminary analysis of technical risk and cost uncertainty in selected DARPA programs
[AD-A107402] N82-29218
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260
STATISTICAL DISTRIBUTIONS
Frequency compression of wideband signals using a distributed sampling technique
[AD-A113428] N82-28519
Some new multivariate distributions with enhanced comparisons via contour and three dimensional plots
[LA-8903-MS] N82-29071
Pre-configural polysampling pushback performance
[AD-A114304] N82-29099
STATISTICAL WEATHER FORECASTING
Time scales of systematic errors in a numerical weather forecast
[AD-A113374] N82-28888
Statistical post-processing of the Navy nested tropical cyclone model and the operational tropical cyclone model
[AD-A114150] N82-28911
STEADY FLOW
Calculation of three-dimensional, inviscid supersonic, steady flows
[NASA-CR-3573] N82-28246
STEAM
Conversion of hydrocarbons for fuel cell applications. Part 1: Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids. Part 2: Steam reforming of n-hexane on pellet and monolithic catalyst beds
[NASA-CR-169134] N82-28787
Steam reforming of n-hexane on pellet and monolithic catalyst beds. A comparative study on improvements due to heat transfer N82-28789
Strategies for steam handling and H2S abatement at geothermal power plants in the geysers area of Northern California
[DE82-001144] N82-28796
Upstream H2S removal from geothermal steam
[DE82-901293] N82-28847
STEELS
The effect of heat transfer on the diffusion-limited cathodic reduction of oxygen on steel in flowing 3.2 percent sodium chloride solution
[NPL-DMA(A)-38] N82-28410
Anisotropic embrittlement in high-hardness ESR 4340 steel forgings
[AD-A113906] N82-28412
Influences of gaseous environment on low growth-rate fatigue crack propagation in steels
[DE82-005134] N82-28423
High fracture toughness bearing development
[AD-A113582] N82-28647
The effect of stress triaxiality on the occurrence of ductile fracture in low strength steels
[DRIC-T-6493] N82-28663
Constitutive relations of randomly oriented steel fiber reinforced concrete under multiaxial compressive loadings
[AD-A114168] N82-28678
STELLAR SPECTRA
Astronomical Society information number 55. Report of the meeting --- conference
[ISSN-0374-1958] N82-29241
STELLAR SPECTROPHOTOMETRY
Astronomical Society information number 55. Report of the meeting --- conference
[ISSN-0374-1958] N82-29241
STEP FUNCTIONS
Multiple step G-contractivity with applications to slowly varying linear systems
[TRITA-NA-8107] N82-29092
STEREOPHOTOGRAPHY
An automated mapping satellite system N82-28734
Circulation statics for the extratropical Northern Hemisphere based on NMC analyses
[PB82-158759] N82-28925
STEROIDS
Testosterone enhances C-14 2-deoxyglucose uptake by striated muscle --- sex hormones and muscle
[NASA-CR-169101] N82-28986
STIELTJES INTEGRAL
Summability methods for divergent integrals and their applications to singular Sturm-Liouville expansions
[AD-A113077] N82-29079
STIFFNESS
Coupled walls in earthquake-resistant building: Parametric investigation and design procedure
[PB82-147901] N82-28487
Structural walls in earthquake-resistant buildings: Dynamic analysis of isolated structural walls. Development of design procedure: Design force levels
[PB82-147794] N82-28488
STIMULI
A procedure for the analysis of nystagmus and other eye movements
[AD-A112603] N82-28987
STIRLING CYCLE
Evaluation of requirements for militarization of 3 kW free piston Stirling engine generator sets
[AD-A113409] N82-28648
Automotive Stirling engine development program
[NASA-CR-167907] N82-29235
STOCHASTIC PROCESSES
Nonparametric estimation of signals mixed with noise
[AD-A113018] N82-28514
The 10th IFIP Conference on System Modeling and Optimization
[AD-A113126] N82-29104
STORAGE RINGS (PARTICLE ACCELERATORS)
Photoneutron generation with electron undulators
[DE82-007034] N82-29142
Fine-grained hodoscopes based on scintillating optical fibers
[DE82-006248] N82-29170
STORAGE STABILITY
Basic study of fuel storage stability
[AD-A114127] N82-28466
STORMS (METEOROLOGY)
Data registration and integration requirements for severe storms research N82-28711
Storm warnings on Lake Balaton
[AD-A114322] N82-28909
Operations of the National Weather Service
[PB82-161829] N82-28927
STRAIN GAGES
The effect of strain upon the velocity of sound and the velocity of free retraction for natural rubber
[AD-A114238] N82-28453
STRAIN HARDENING
Crack velocities in natural rubber
[AD-A114298] N82-28677
STRAIN RATE
Erosion mechanisms of metals
[AD-A111537] N82-28418
The effect of strain upon the velocity of sound and the velocity of free retraction for natural rubber
[AD-A114238] N82-28453
STRAPDOWN INERTIAL GUIDANCE
New sensor concepts: Low cost vibrating beam accelerometer
[AD-A113644] N82-28272
STRATEGY
An intelligent control strategy for computer consultation
[AD-A113386] N82-29016
STRATOSPHERE
One-and two dimensional photochemical modeling of the chemical interactions in the middle atmosphere (0-120 km)
[PB82-156613] N82-28874
Identification of requirements for atmospheric data --- to determine nuclear explosion effects on weapon systems
[AD-A113640] N82-28886
LRIR observations of the structure and propagation of the stationary planetary waves in the Northern Hemisphere during December 1975
[PB82-156639] N82-28921
STREAM FUNCTIONS (FLUIDS)
Research on augmentation of turbulent mixing
[AD-A114310] N82-28591
STREAMLINING
Streamlining the walls of an empty two-dimensional flexible-walled test section
[NASA-CR-165936] N82-28304
STREAMS
Hydrogeochemical and stream sediment reconnaissance basic data for Sheridan quadrangle, Wyoming
[DE82-002467] N82-28748
Hydrogeochemical and stream sediment reconnaissance basic data for Ophir, Alaska
[DE82-000851] N82-28753
Hydrogeochemical and stream sediment reconnaissance basic data for Cheyenne quadrangle, Wyoming
[DE82-000786] N82-28754
Hydrogeochemical and stream sediment reconnaissance basic data for Preston quadrangle, Wyoming; Idaho
[DE82-000783] N82-28755
Hydrogeochemical and stream sediment reconnaissance basic data for Tularosa quadrangle, New Mexico
[DE82-000787] N82-28756
Hydrogeochemical and stream sediment reconnaissance basic data for Brownfield quadrangle, New Mexico; Texas
[DE82-000855] N82-28762
Water resources data for Alabama, water year 1980. Volume 1: Apalachicola Choctawatchee, Blackwater, Escambia, Perdido, and Alabama River Basins
[PB82-164112] N82-28777
STRESS (PHYSIOLOGY)
Special investigation report: Air traffic control system
[PB82-136276] N82-28277
Role of hormonal compounds in regulation of electrolyte metabolism in the presence of emotional stress N82-28952
Slow waves of cardiac rhythm in healthy man under different conditions N82-28955
Physiological studies of heat stress acclimation during a specific exercise regimen
[AD-A111897] N82-28991
Task analysis and the ability requirements of tasks: Collected papers
[AD-A111181] N82-29000
STRESS (PSYCHOLOGY)
Task analysis and the ability requirements of tasks: Collected papers
[AD-A111181] N82-29000
STRESS ANALYSIS
Research study to define the critical failure mechanisms in notched composites under compression fatigue loading
[AD-A113654] N82-28356
An analysis of solid propellant transient viscoelastic response under motor ignition conditions
[AD-A114345] N82-28467
Stress anlaysis of two mini-hat pressure gage designs
[AD-A112186] N82-28607
The optimal design of involute gear teeth with unequal addenda
[NASA-TM-82866] N82-28645
A finite element stress analysis of spur gears including fillet radii and rim thickness effects
[NASA-TM-82865] N82-28646
The design of cams for creep testing at constant stress
[NPL-DMA(B)-23] N82-28668

Quasi-square hole with optimum shape in an infinite plate subjected in in-plane loading. Optimization of inner and outer boundaries of beams and plates with holes
[AD-A114370] N82-28679
Applied stress determination using computerized ultrasonic techniques
[DE82-003894] N82-28681
External loads on nozzles in cylindrical shells
[CRIF-MT-146] N82-28687

STRESS CONCENTRATION
Quasi-square hole with optimum shape in an infinite plate subjected in in-plane loading. Optimization of inner and outer boundaries of beams and plates with holes
[AD-A114370] N82-28679

STRESS CORROSION CRACKING
Stress corrosion cracking of alloy 600
[DE82-901313] N82-28429
The Jominy end-quench test for investigation of corrosion properties and microstructure of high strength aluminum alloys
[NLR-TR-80102-U] N82-28434
Stress corrosion crack initiation testing of high strength aluminum alloys using tuning fork type specimens
[NLR-TR-81053-U] N82-28686

STRESS INTENSITY FACTORS
Fatigue crack propagation thresholds for long and short cracks in Rene 95 nickel-base superalloy
[DE82-005135] N82-28422

STRESS MEASUREMENT
Applied stress determination using computerized ultrasonic techniques
[DE82-003894] N82-28681

STRESS RELAXATION
Thermal relaxation in autofrettaged cylinders
[AD-A113210] N82-28672

STRESS-STRAIN RELATIONSHIPS
Elevated temperature behavior of metal-matrix composites
[AD-A113128] N82-28359
Constitutive relations of randomly oriented steel fiber reinforced concrete under multiaxial compressive loadings
[AD-A114168] N82-28678

STRESSES
Effect of applied stress, thermal environment and water in epoxy resins
[AD-A113016] N82-28450

STRONTIUM TITANATES
Photocatalytic hydrogen production from water and intermetallic compound formation on single-crystal surfaces of titanium oxides
[DE82-004952] N82-28393

STRUCTURAL ANALYSIS
Catalytic coal conversion support: Use of laser flash pyrolysis for structural analysis
[DE82-004176] N82-28391
Coupled walls in earthquake-resistant building: Parametric investigation and design procedure
[PB82-147901] N82-28487
Structural walls in earthquake-resistant buildings: Dynamic analysis of isolated structural walls. Development of design procedure: Design force levels
[PB82-147794] N82-28488
Two-dimensional hybrid modelling of soil-structure interaction
[PB82-142118] N82-28489
Chemical structure by laser-produced X-rays
[AD-A113864] N82-28627
Non-destructive evaluation of defects in structural materials using long-wavelength neutrons
[AD-A113500] N82-28656
Improved finite element methodology for integrated thermal structural analysis
[NASA-CR-169126] N82-28666
Slurry walls as an integral part of underground transportation structures
[PB82-145061] N82-29238

STRUCTURAL BASINS
Water resources data for West Virginia, water year 1980. Appendix: Coal areas
[PB82-159674] N82-28778

STRUCTURAL DESIGN
Passive-solar construction handbook
[DE82-002455] N82-28483
Coupled walls in earthquake-resistant building: Parametric investigation and design procedure
[PB82-147901] N82-28487
Structural walls in earthquake-resistant buildings: Dynamic analysis of isolated structural walls. Development of design procedure: Design force levels
[PB82-147794] N82-28488
Slurry walls as an integral part of underground transportation structures
[PB82-145061] N82-29238

STRUCTURAL DESIGN CRITERIA
Powerhouse-gate: Concept definition study
[DE82-006226] N82-28834

STRUCTURAL ENGINEERING
Geotechnical computer program survey
[AD-A114106] N82-28481
Preparing and communicating habitability design information
[AD-A113379] N82-28518

STRUCTURAL PROPERTIES (GEOLOGY)
Interpretation of time-domain electromagnetic soundings in the Calico Hills area, Nevada Test Site, Nye County, Nevada
[DE82-004260] N82-28869

STRUCTURAL STRAIN
Tensile and fatigue strength properties of Kevlar 29 aramid/epoxy unidirectional composites --- used in flywheels
[DE82-006777] N82-28362

STRUCTURAL VIBRATION
Limiting performance of nonlinear systems with applications to helicopter vibration control problems
[AD-A113239] N82-28301
The shock and vibration digest, volume 14, no. 5
[AD-A115091] N82-28659
Analysis of measured structural frequency response data N82-28675

STURM-LIOUVILLE THEORY
Summability methods for divergent integrals and their applications to singular Sturm-Liouville expansions
[AD-A113077] N82-29079

SUBMERGED BODIES
Buried insulated antennas
[RSRE-MEMO-3418] N82-28497
Measurement methods for fluid shear stress
[AD-A113020] N82-28582

SUBMERGING
Endurance of +Gz G forces by middle-aged people before and after 7-day immersion N82-28958
Human external respiration and gas exchange in acute period of adaptation to immersion in water N82-28959

SUBREFLECTORS
Cassegrain dual reflector antenna design --- MSAT UHF antenna N82-28336

SUBROUTINE LIBRARIES (COMPUTERS)
Systems Technology Laboratory (STL) compendium of utilities
[NASA-TM-84799] N82-29034
Programming guide for colour graphics on the NORPAK VDP/VGS and VDP/RGS
[AD-A113429] N82-29046

SUBROUTINES
EOSMOD: A subroutine package for calculating equations of state and opacities
[DE82-004676] N82-29059

SULFUR DIOXIDES
Electrochemistry of sulfur dioxide in nonaqueous solutions, part 1
[AD-A113033] N82-28379

SUM RULES
Summability methods for divergent integrals and their applications to singular Sturm-Liouville expansions
[AD-A113077] N82-29079

SUMMER
Storm warnings on Lake Balaton
[AD-A114322] N82-28909

SUN
Solar observations from the P78-1 satellite
[AD-A112873] N82-29257

SUPERCONDUCTING MAGNETS
Stability of superconducting ISABELLE dipole magnets
[DE82-006843] N82-29190

SUPERCONDUCTIVITY
Proximity effect in Cu-NbSn composites
[DE82-005449] N82-28361
Search for superconductivity in ion-implanted b-Ge films
[IPNO-PHN-80-22] N82-29211

SUPERCONDUCTORS
Controlled grain boundary structures in superconductors
[AD-A114243] N82-29208

SUPERCRITICAL WINGS
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280

SUPERHIGH FREQUENCIES
Multipath analysis of telemetry support positions for APATS
[AD-A114057] N82-28342
A simulation system for validating the analytical prediction of performance of the convolutional encoded and symbol interleaved TDRSS S-band return link service in a pulsed RFI environment
[NASA-CR-170428] N82-28500
S-band radar pulse densities in the Los Angeles area
[AD-A114116] N82-28529

SUPERPLASTICITY
Non-destructive evaluation of defects in structural materials using long-wavelength neutrons
[AD-A113500] N82-28656

SUPERSONIC AIRFOILS
Research model wing/tail fabrication --- transonic wind tunnel 1/7.5-scale model
[AD-A114101] N82-28288

SUPERSONIC FLOW
Calculation of three-dimensional, inviscid supersonic, steady flows
[NASA-CR-3573] N82-28246

SURFACE ACOUSTIC WAVE DEVICES
High speed SAW spectrum analyser data handling --- surface acoustic wave (SAW)
[RSRE-MEMO-3450] N82-28546

SURFACE ENERGY
The use of a perfectly conducting sphere to excite the plasmon of a flat surface. 1: Calculation of the local field with applications to surface enhanced spectroscopy
[AD-A114278] N82-28384

SURFACE LAYERS
Special observations by the Hohenpeissenburg Meteorological Observatory. No. 44: Results of aerological and surface ozone measurements during the first semester of 1981
[ISSN-0581-1287] N82-28877

SURFACE NAVIGATION
Aids to navigation principal findings on the CAORF experiment. The performance of visual aids to navigation as evaluated by simulation
[AD-A107045] N82-28271

SURFACE PROPERTIES
Use of metallurgical variables and surface properties to control hydrogen embrittlement
[AD-A114190] N82-28420
Development of a surface technology for GaAs devices
[AD-A112913] N82-29206

SURFACE REACTIONS
The use of a perfectly conducting sphere to excite the plasmon of a flat surface. 1: Calculation of the local field with applications to surface enhanced spectroscopy
[AD-A114278] N82-28384
Surface enhanced spectroscopy
[AD-A114274] N82-28385
Gas-solid reactions. Part 1: External diffusion-controlled reactions
[AD-A114086] N82-28387
Integrated approach to the systematic synthesis, characterization, and catalytic activity of novel heterogeneous catalysts
[DE82-004898] N82-28404
Conversion of hydrocarbons for fuel cell applications. Part 1: Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids. Part 2: Steam reforming of n-hexane on pellet and monolithic catalyst beds
[NASA-CR-169134] N82-28787
Steam reforming of n-hexane on pellet and monolithic catalyst beds. A comparative study on improvements due to heat transfer N82-28789

T

Initial stages of oxidation on single crystals of lithium hydride interaction between single crystal lithium hydride and a stainless steel, high vacuum container
[DE82-005614] N82-29212

SURFACE ROUGHNESS
Texturing polymer surfaces by transfer casting --- cardiovascular prosthesis
[NASA-CASE-LEW-13120-1] N82-28440
Study of turbulent boundary layers over rough surfaces with emphasis n the effects of roughness character and Mach number
[AD-A114217] N82-28588

SURFACE TEMPERATURE
Laser-generated electron emission from surfaces: Effect of the pulse shape on temperature and transient phenomena
[AD-A114282] N82-28633
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Bangor International/Dow AFB, Maine. Parts A-F
[AD-A113178] N82-28896
Boundary subroutine for the NCAR global climate model
[PB82-158742] N82-28924

SURFACE WAVES
Solid state research
[AD-A114189] N82-29209

SURVIVAL EQUIPMENT
Metabolic distinctions related to intake of low-calorie 'survival' rations consisting only of readily assimilated carbohydrates N82-28953

SWEDEN
Fine scale structures in time and space of rainfall rate --- Sweden
[FOA-C-20448-E2] N82-28919

SWEPT WINGS
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263

SWINE
The biological effects of repeated blasts
[AD-A113113] N82-28990

SWITCHING CIRCUITS
Acoustooptic time-integrating correlators and optoelectronic mixers
[AD-A114149] N82-28548
Technical guidelines for LSI hybrid microcircuits
[AD-A114437] N82-28562
Stability of a 100-kV self-firing spark gap
[DE82-005718] N82-28570
Design and fabrication of multimode optical switches
[AD-A113812] N82-29159

SYMBOLIC PROGRAMMING
PARSER: A tool for command interpretation
[DE82-006829] N82-29064

SYNCHRONISM
Decentralized resource management in distributed computer systems
[AD-A113255] N82-29069

SYNCHRONOUS PLATFORMS
A report of the technological aspects of regulatory-policy issues of geostationary platforms
[PB82-142191] N82-28540
Spaceborne scanner imaging system errors N82-28713

SYNCHRONOUS SATELLITES
Land Mobile Satellite Service N82-28326
MSAT design N82-28328
Data registration and integration requirements for severe storms research N82-28711

SYNCHROTRON RADIATION
Galactic radiation belts
[AD-A111836] N82-29244

SYNCHROTRONS
Compton effect in the SPS: Its application in beam profile measurement
[DE82-002534] N82-29136

SYNTHESIS (CHEMISTRY)
Inorganic halogen oxidizer research
[AD-A114196] N82-28382
Sinterable powders from laser driven reactions
[AD-A114062] N82-28628
Monograph on new direction of chemistry and biology of peptide and protein bioregulators reviewed N82-28979

SYNTHESIZERS
Computer-generated speech
[DE82-004672] N82-29063

SYNTHETIC APERTURE RADAR
Method and apparatus for Delta K synthetic aperature radar measurement of ocean current
[NASA-CASE-NPO-15704-1] N82-28502
Geometric and rediametric distortion in spaceborne SAR imagery N82-28717

SYNTHETIC FUELS
Ecological implications of air pollutants from synthetic-fuels processing
[DE82-002792] N82-28844

SYSTEM EFFECTIVENESS
Operational test and evaluation handbook for aircrew training devices. Volume 2: Operational effectiveness evaluation
[AD-A112570] N82-28305
Cost effective communication with the electronic, microprocessor-controlled SPC telephone system EMS
[MBB-512-82-O] N82-28536
More ease in communication --- telephone system EMS 12,000
[MBB-513-82-O] N82-28537

SYSTEM FAILURES
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43)
[B-206064] N82-28264
Reliability growth of continuous systems
[AD-A114099] N82-28658

SYSTEMS ANALYSIS
Nonlinear system identification technique validation
[AD-A112593] N82-28505
A Rand note: Policy analysis of water management for the Netherlands. Volume 16: Costs for infrastructure tactics
[RAND/N-1500/16-NETH] N82-28692
Data vs. information: A system paradigm N82-28732

SYSTEMS COMPATIBILITY
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) state-of-the-art computer systems/ compatibility study
[NASA-TM-84792] N82-29042

SYSTEMS ENGINEERING
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294
Availability analysis of a multiplex system
[FUB-30-1981] N82-28533
Methodology for the description and validation of communication protocols --- mathematical models
[FUB-31-1981] N82-28534
A design methodology for nonlinear systems containing parameter uncertainty: Application to nonlinear controller design
[NASA-CR-166358] N82-29005
The 10th IFIP Conference on System Modeling and Optimization
[AD-A113126] N82-29104

SYSTEMS INTEGRATION
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523
Future computing
[RAND/P-6680] N82-29020
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022
GPSPAC/LANDSAT-D Interface (GLI) system description
[NASA-TM-84803] N82-29037

SYSTEMS MANAGEMENT
Special investigation report: Air traffic control system
[PB82-136276] N82-28277
Decentralized resource management in distributed computer systems
[AD-A113255] N82-29069

SYSTOLE
Dynamics of left ventricular systolic phase structure during long-term (140-185 days) spaceflights N82-28954

TABLES (DATA)
Environmental data for sites in the National Solar Data Network, October 1981
[DE82-002706] N82-28850
Occurrences of the polar slant E condition (SEC) at Narssarssuaq, Godhavn, Thule, Denmark for 1980 N82-28873
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Taegu AB, Korea. Parts A, C-F
[AD-A113228] N82-28889
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Lajes AB, Azores. Parts A-F
[AD-A113227] N82-28890
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Forbes Fld, Kansas. Parts A-F
[AD-A113226] N82-28891
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Thule AB, Greenland. Parts A-F
[AD-A113225] N82-28892
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Burlington IAP, Vermont. Parts A-F
[AD-A113224] N82-28893
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Scott AFB, Belleville, Illinois. Parts A-F
[AD-A113177] N82-28897
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Amarillo MAP, Texas. Parts A-F
[AD-A113176] N82-28898
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Edmonton IAP, Alberta, Canada. Parts A-F
[AD-A113175] N82-28899
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Nellis AFB, Las Vegas, Nevada. Parts A-F
[AD-A113154] N82-28900
Revised Uniform Summary of Surface Weather Observations (RUSSWO). McConnell AFB, Wichita, Kansas. Parts A-F
[AD-A113155] N82-28901
Climatology tables for 7 Corps forward areas
[AD-A113034] N82-28902
Wind energy resource atlas. Volume 2: TVA power service area
[DE82-004877] N82-28914
Wind resource analysis for the Tennessee Valley authority region, volume 3
[DE82-006196] N82-28915
Wind resource analysis for the Tennessee Valley authority region, volume 4
[DE82-005103] N82-28916
The annual variation of the large-scale 500 mb and sea level pressure fields
[DM-35] N82-28918
Fine scale structures in time and space of rainfall rate --- Sweden
[FOA-C-20448-E2] N82-28919
Summer MONEX US research flight missions, May - July 1979
[PB82-158718] N82-28923
Complete statistical ranking of populations, with tables and applications
[AD-A114400] N82-29098

TAIL ASSEMBLIES
Research model wing/tail fabrication --- transonic wind tunnel 1/7.5-scale model
[AD-A114101] N82-28288

TAKEOFF
Alert aircraft roll over chocks
[AD-A107456] N82-28307

TANKS (CONTAINERS)
Hydraulic tests of tanks for dangerous goods --- determination of the test pressure
[SP-RAPP-1982:01] N82-28683

TANTALUM ALLOYS
Thermotransport of hydrogen and deuterium in vanadium, niobium and tantalum alloys
[DE82-005453] N82-28424

TANTALUM COMPOUNDS
Reduction of carbon monoxide. Past research summary
[DE82-007524] N82-28405
TARGET RECOGNITION
Experimental time-domain determination of complex resonances of simple objects --- radar scattering and target recognition
[AD-A113168] N82-28521
TARGETS
Sticking of comet dust to target surfaces
[TUM-LRT-TB-81/1] N82-29252
Comet dust collection
[TUM-LRT-TB-81/13] N82-29253
TASK COMPLEXITY
Task analysis and the ability requirements of tasks: Collected papers
[AD-A111181] N82-29000
TASKS
On models and methods for performance measurement
[AD-A113578] N82-28998
Empirical comparison of binary and continuous proximity measures for clustering occupational task data
[AD-A112930] N82-29097
TAXIING
Alert aircraft roll over chocks
[AD-A107456] N82-28307
TAYLOR SERIES
A method for the circulation of invariant manifolds in hydrodynamic stability problems
[PB82-158825] N82-28603
TDR SATELLITES
A simulation system for validating the analytical prediction of performance of the convolutional encoded and symbol interleaved TDRSS S-band return link service in a pulsed RFI environment
[NASA-CR-170428] N82-28500
The two-way TDRSS observation model for the LSI-11/23 microcomputer
[NASA-TM-84793] N82-29029
TEARING
Threshold tear strength of elastomers
[AD-A114239] N82-28452
Drift resistive interchange and tearing modes in cylindrical geometry
[AD-A113499] N82-29179
TECHNICAL WRITING
Preparing and communicating habitability design information
[AD-A113379] N82-28518
TECHNOLOGICAL FORECASTING
Future communication satellite systems and technology trends
[MBB-UB-542-81-O] N82-28322
Advanced casting: Today and tomorrow --- aerospace industry components casting N82-28486
Report of Ad Hoc NDAB subgroup --- numerical data
[AD-A112955] N82-29227
TECHNOLOGY ASSESSMENT
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274
Fifteen years experience with composite propeller blades --- for hovercraft N82-28363
More ease in communication --- telephone system EMS 12,000
[MBB-513-82-O] N82-28537
A survey of some recent developments in laser Raman spectroscopy
[MQAD-TP-797] N82-28617
Bureau of Mines research 1981: A summary of significant results in mineral technology and economics
[PB82-159971] N82-28776
Distributed operating system design study, volume 1
[AD-A113172] N82-29067
Distributed operating system design study, volume 2
[AD-A113173] N82-29068
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901280] N82-29106
Particle beam weapons
[AD-A114383] N82-29147
Fiber optics technological review and assessment for traffic control
[PB82-145616] N82-29173
TECHNOLOGY TRANSFER
Fossil energy program
[DE82-005947] N82-28824
TECHNOLOGY UTILIZATION
State of the art and development of nonmetallic materials: Glass, ceramic, graphite
[MBB-509-O] N82-28457
A survey of some recent developments in laser Raman spectroscopy
[MQAD-TP-797] N82-28617
TELECOMMUNICATION
LMSS telecommunication network design N82-28327
Electromagnetic wave trajectories at VHF and higher frequencies
[PB82-134289] N82-28538
TELECONFERENCING
A virtual space video conferencing demonstration system
[AD-A114120] N82-28526
Audio conferencing using dynamic channel-assignment system
[AD-A114122] N82-28528
Network specifications for a virtual space teleconferencing system
[AD-A114119] N82-28530
TELEMETRY
Multipath analysis of telemetry support positions for APATS
[AD-A114057] N82-28342
Analog data compression for Versatile Experimental Kevlar Array (VEKA) telemetry
[AD-A114324] N82-28343
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689
TELEPHONES
Cost effective communication with the electronic, microprocessor-controlled SPC telephone system EMS
[MBB-512-82-O] N82-28536
More ease in communication --- telephone system EMS 12,000
[MBB-513-82-O] N82-28537
TELEVISION CAMERAS
A virtual space video conferencing demonstration system
[AD-A114120] N82-28526
TEMPERATURE DEPENDENCE
Elevated temperature behavior of metal-matrix composites
[AD-A113128] N82-28359
An experimental and numerical study of an air-to-air heat exchanger using liquid reservoir variable conductance heat pipes
[AD-A113354] N82-28585
Thermo-optical properties of optical glasses
[DE82-003681] N82-29169
TEMPERATURE DISTRIBUTION
Investigation of the long term behavior of heat pipes
[IKE-5-215] N82-28597
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Bangor International/Dow AFB, Maine. Parts A-F
[AD-A113178] N82-28896
TEMPERATURE EFFECTS
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reacting flows
[NASA-CR-169124] N82-28576
Physiological studies of heat stress acclimation during a specific exercise regimen
[AD-A111897] N82-28991
The influence of the temperature coefficient of refractive index on a thermal imager
[RSRE-MEMO-3398] N82-29156
TEMPERATURE GRADIENTS
Studies of the dynamic and mechanical properties of thermoplastics by the split Hopkinson pressure bar method
[PH-130] N82-28443
TEMPERATURE MEASUREMENT
Internal heat deposition in laser highly accelerated targets
[AD-A114206] N82-28639
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Randolph AFB, San Antonio, Texas. Parts A-F
[AD-A113704] N82-28887
Weighting factors in the DOE-2 computer program
[DE81-028593] N82-29057
TEMPERATURE MEASURING INSTRUMENTS
Quality control and nondestructive evaluation techniques for composites. Part 7: Thermography: A state-of-the-art review
[AD-A114392] N82-28657
TEMPORAL RESOLUTION
A concept for a future ground control data set for image correction N82-28738
TENSILE DEFORMATION
Investigation of the tensile deformation and fracture of dual-phase steel
[DE82-007522] N82-28682
TENSILE STRENGTH
Tensile and fatigue strength properties of Kevlar 29 aramid/epoxy unidirectional composites --- used in flywheels
[DE82-006777] N82-28362
TENSOR ANALYSIS
On the nonlinear conductivity tensor for an unmagnetized relativistic turbulent plasma
[AD-A113699] N82-29176
TERMINAL BALLISTICS
Sticking of comet dust to target surfaces
[TUM-LRT-TB-81/1] N82-29252
TERMINOLOGY
Local and regional winds: Their names and attributes
[AD-A114224] N82-28908
Energy data base: Subject thesaurus permutated listing
[DE82-005770] N82-29229
TERRAIN
The use of terrain height information for improving the accuracy of classification of LANDSAT data
[RAE-TM-SPACE-297] N82-28696
TERRAIN ANALYSIS
The use of terrain height information for improving the accuracy of classification of LANDSAT data
[RAE-TM-SPACE-297] N82-28696
TEST FACILITIES
Six-degree-of-freedom (6-DOF) simulator for weapon testing
[AD-A113536] N82-28308
The shock and vibration digest, volume 14, no. 4
[AD-A114448] N82-28673
The changing dimensions of qualification testing N82-28674
Analysis of measured structural frequency response data N82-28675
TETHERED BALLOONS
Pointing payload for single tether balloons and other projects
[AD-A114447] N82-28259
TEXAS
Hydrogeochemical and stream sediment reconnaissance basic data for Dalias NTMS quadrangle, Texas
[DE82-000856] N82-28763
TEXTURES
Texturing polymer surfaces by transfer casting --- cardiovascular prosthesis
[NASA-CASE-LEW-13120-1] N82-28440
THEMATIC MAPPING
Thematic mapper performance N82-28714
Scanner imaging systems, aircraft N82-28715
Geometric error characterization and error budgets --- thematic mapper N82-28729
THERMAL ABSORPTION
Quantitative thermal desorption spectrometry of noble gases in solids N82-28369
Quantitative thermal description spectrometry of ionically implanted inert gases. 1: Fundamental aspects N82-28370
Quantitative thermal desorption spectrometry of ionically implanted inert gases. 2: Technical requirements N82-28371
THERMAL BATTERIES
Lithium oxide in the Li(Si)/FeS2 thermal battery system
[DE82-005114] N82-28818
THERMAL COMFORT
Thermal garment
[NASA-CASE-XMS-03694-1] N82-29002

THERMAL CONDUCTIVITY
Thermotransport of hydrogen and deuterium in vanadium, niobium and tantalum alloys
[DE82-005453] N82-28424
An experimental and numerical study of an air-to-air heat exchanger using liquid reservoir variable conductance heat pipes
[AD-A113354] N82-28585
THERMAL DEGRADATION
Liquid crystal materials for matrix displays
[AD-A114444] N82-29207
THERMAL DISSOCIATION
Conversion of hydrocarbons for fuel cell applications. Part 1: Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids. Part 2: Steam reforming of n-hexane on pellet and monolithic catalyst beds
[NASA-CR-169134] N82-28787
Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids N82-28788
Steam reforming of n-hexane on pellet and monolithic catalyst beds. A comparative study on improvements due to heat transfer N82-28789
THERMAL ENERGY
Conceptual design and engineering studies of adiabatic Compressed Air Energy Storage (CAES) with thermal energy storage
[DE82-005483] N82-28823
Thermal properties of metallic sodium near melt from molecular dynamics calculations
[DE81-030307] N82-29132
THERMAL EXPANSION
High fracture toughness bearing development
[AD-A113582] N82-28647
Thermal relaxation in autofrettaged cylinders
[AD-A113210] N82-28672
THERMAL INSULATION
NBS/ESDS: A computer model for the simulation of hot water systems
[PB82-139361] N82-28492
Thermal garment
[NASA-CASE-XMS-03694-1] N82-29002
THERMAL MAPPING
Infrared transmittance of marine atmospheres --- sea surface temperature
[AD-A114414] N82-29164
THERMAL PROTECTION
Spray applicator for spraying coatings and other fluids in space
[NASA-CASE-MSC-18852-1] N82-28640
THERMAL RADIATION
Thermal energy storage in phase change material
[AD-A113355] N82-28793
THERMAL SIMULATION
Dynamic analysis and simulation of a large scale thermal simulator
[DE82-005588] N82-28802
Design and validation of a thermal simulator for solar system performance testing
[DE82-005589] N82-28803
THERMAL STABILITY
Thermal analysis of SYNROC gel microspheres
[DE82-003472] N82-28399
Effect of hydrocarbon fuel type on fuel
[NASA-TM-82916] N82-28460
THERMAL STRESSES
Cryogenic performance of slotted brazed Rene 41 honeycomb panels
[NASA-CR-3525] N82-28664
Improved finite element methodology for integrated thermal structural analysis
[NASA-CR-169126] N82-28666
Thermal relaxation in autofrettaged cylinders
[AD-A113210] N82-28672
THERMOCHEMISTRY
Thermochemical generation of hydrogen
[NASA-CASE-NPO-15015-1] N82-28368
Coupling of transport and chemical processes in catalytic combustion
[DE82-006267] N82-28403
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reacting flows
[NASA-CR-169124] N82-28576
THERMODYNAMIC EFFICIENCY
The influence of the working fluid on a turbine and Rankine cycle design efficiency
[MBB-UR-535-82-O] N82-28652
THERMODYNAMIC PROPERTIES
Elevated temperature behavior of metal-matrix composites
[AD-A113128] N82-28359
The high temperature thermochemical properties of carbon
[NASA-TM-84710] N82-28380
Application of solidification theory to rapid solidification processing
[AD-A112864] N82-28411
Internal heat deposition in laser highly accelerated targets
[AD-A114206] N82-28639
Variability and sensitivity of coupled mixed layer acoustic model systems
[AD-A114302] N82-29123
Thermal properties of metallic sodium near melt from molecular dynamics calculations
[DE81-030307] N82-29132
THERMODYNAMICS
Experimental study of the thermodynamics of thin films and surfaces
[DE82-004887] N82-29215
THERMOELECTRIC GENERATORS
Environmental and radiological safety studies. Interaction of Pu-23802 heat sources with terrestrial and aquatic environments
[DE82-004681] N82-28848
THERMOELECTRICITY
Electrothermal analytical response inspection of electroexplosive devices
[AD-A112328] N82-28461
THERMOPLASTIC RESINS
Studies of the dynamic and mechanical properties of thermoplastics by the split Hopkinson pressure bar method
[PH-130] N82-28443
THERMOVISCOELASTICITY
Recent developments in hygrothermoviscoelastic analysis of composites N82-28676
THESAURI
Energy data base: Subject thesaurus permutated listing
[DE82-005770] N82-29229
THICK FILMS
Evaluation of thick-file inks for solar cell grid metallization
[DE82-005615] N82-28814
THICKNESS
A finite element stress analysis of spur gears including fillet radii and rim thickness effects
[NASA-TM-82865] N82-28646
THIN FILMS
Silver-doping effects and photostructural transformation in evaporated As2S3 thin films
[AD-A113148] N82-28375
Ion beam sputter deposited diamond like films
[NASA-TM-82873] N82-28445
The dryout region in frictionally heated sliding contacts
[NASA-TM-82796] N82-28574
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE82-004259] N82-28811
Study of the physics of insulating films as related to the reliability of metal oxide semiconductor (MOS) devices
[AD-A112501] N82-29201
Search for superconductivity in ion-implanted b-Ge films
[IPNO-PHN-80-22] N82-29211
Experimental study of the thermodynamics of thin films and surfaces
[DE82-004887] N82-29215
THIN WALLED SHELLS
Proceedings of the Conference on Finite Element Methods in South Africa N82-28671
THOMSON SCATTERING
First 50 pulse per sec Thomson scattering diagnostics in a Tokamak
[IPF-81-13] N82-29199
THREE DIMENSIONAL FLOW
Calculation of three-dimensional, inviscid supersonic, steady flows
[NASA-CR-3573] N82-28246
Computer program for calculating full potential transonic, quasi-three-dimensional flow through a rotating turbomachinery blade row
[NASA-TP-2030] N82-28247
Numerical simulation of wall-bounded turbulent shear flows
[NASA-TM-84259] N82-28577
Computation of turbulent horseshoe vortex flow past swept and unswept leading edges
[AD-A113534] N82-28584
Numerical simulations of magneto-hydrodynamic chemically reactive flows in three-dimensions on a vector computer
[AD-A113487] N82-29049
THRESHOLD LOGIC
Threshold tear strength of elastomers
[AD-A114239] N82-28452
THRESHOLDS (PERCEPTION)
Effect of caloric stimulation of vestibular system on hearing N82-28963
Determining visual acuity thresholds: A simulation study of stimulus presentation strategies
[AD-A111821] N82-28992
THRUST
Electric propulsion --- pulsed plasma thruster and electron bombardment ion engine for MSAT attitude control and stationkeeping N82-28341
THUNDERSTORMS
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Atlantic City, New Jersey. Parts A-F
[AD-A113180] N82-28894
Case studies on convective storms, case study 10, 22 July 1975: Mature storm study: A conceptual model synthesized from microphysical and dynamic observations of a multicell thunderstorm
[PB82-159567] N82-28928
TILT ROTOR AIRCRAFT
The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft
[NASA-CR-137803] N82-28281
TIMBER INVENTORY
USDA registration and rectification requirements N82-28708
TIME DEPENDENCE
The frequency shift of a pulse by a time-independent, dispersive, lossy medium
[PB82-161977] N82-28542
VNAP2: A computer program for computation of two-dimensional, time-dependent, compressible, turbulent flow
[NASA-CR-169103] N82-28596
TIME SERIES ANALYSIS
Nonparametric estimation of signals mixed with noise
[AD-A113018] N82-28514
Bias reduction
[AD-A114254] N82-29100
TIME SIGNALS
IRIG-Time synchronized binary video data inserter
[AD-A107119] N82-28506
TIN ALLOYS
Proximity effect in Cu-NbSn composites
[DE82-005449] N82-28361
TIRES
Rolling resistance of electric vehicle tires from track tests
[NASA-TM-82836] N82-28786
TISSUES (BIOLOGY)
Nitrogen compound levels in tissues of rat cerebral hemispheres and cerebellum after flight aboard Cosmos-1129 biosatellite N82-28967
TITANIUM
A study of the breakdown mechanism of AISI 304 stainless steel, type 2024 aluminum and various titanium coatings
[AD-A113831] N82-28414
Materials research for advanced inertial instrumentation. Task 2: Gas bearing material development
[AD-A113518] N82-28649
TITANIUM ALLOYS
International aviation (selected articles)
[AD-A114422] N82-28245
TITANIUM OXIDES
Photocatalytic hydrogen production from water and intermetallic compound formation on single-crystal surfaces of titanium oxides
[DE82-004952] N82-28393

TOKAMAK DEVICES
Feedback control of thermal runaway with compression-decompression
[IPPJ-573] N82-29175
Plasma assessments for the Fusion Engineering Device (FED)
[DE82-004649] N82-29184
Tokamaks with high-performance resistive magnets: Advanced test reactors and prospects for commercial applications
[DE82-007366] N82-29188
Heat removal from the simulation electrode of a high power log pulse ion source
[DE81-700008] N82-29192
First 50 pulse per sec Thomson scattering diagnostics in a Tokamak
[IPF-81-13] N82-29199
Experimental studies of anomalous plasma heating in TORTUR 2
[REPT-82-141] N82-29200

TOMAHAWK MISSILES
Flight termination system equipment. Volume 1: Antennas and antenna couplers
[AD-A113493] N82-28320

TOPOGRAPHY
An automated mapping satellite system
N82-28734
Wind resource analysis for the Tennessee Valley authority region, volume 1
[DE82-004927] N82-28913

TOROIDAL PLASMAS
Toroidal plasma MHD equilibrium code EQUCIR version 1
[DE81-700128] N82-29193
Experimental studies of anomalous plasma heating in TORTUR 2
[REPT-82-141] N82-29200

TORSIONAL STRESS
Automated torsion pendulum: Control and data collection/reduction using a desktop computer
[AD-A113038] N82-28670

TORUSES
Numerical study of the Columbia high-beta device: Torus-2
[DE82-007363] N82-29187

TOWED BODIES
Apparatus for releasably connecting first and second objects in predetermined space relationship
[NASA-CASE-MSC-18969-1] N82-28318

TOXIC HAZARDS
Impregnated filters for the determination of formaldehyde in indoor environments
[DE82-004025] N82-28852
An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994

TOXICITY
The consequences of hydrazine exposition and its treatment
[MBL-1981-2] N82-28996

TRACE ELEMENTS
The application of a bubbling mercury electrode to anodic stripping voltammetry. Determination of zinc, cadium, lead and copper in natural water and industrial waste
[DRIC-T-6565] N82-28791

TRACKING RADAR
Optimal alpha-beta filtering for tracking reentry vehicles from shipboard radars
[AD-A113076] N82-28314

TRAFFIC
Traffic capacity through work zones on urban freeways
[PB82-143009] N82-29239

TRAFFIC CONTROL
Fiber optics technological review and assessment for traffic control
[PB82-145616] N82-29173

TRAINING DEVICES
Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268
Development of slide program describing site-selection process for Small Wind Energy Conversion Systems (SWECS)
[DE82-006209] N82-28831

TRAINING EVALUATION
Operational test and evaluation handbook for aircrew training devices. Volume 2: Operational effectiveness evaluation
[AD-A112570] N82-28305
Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306

TRAINING SIMULATORS
Operational test and evaluation handbook for aircrew training devices. Volume 2: Operational effectiveness evaluation
[AD-A112570] N82-28305
Unconventional visual displays for flight training
[AD-A111392] N82-28999

TRANSDUCERS
Sensor technology
[FOA-C-30262-E1] N82-28613
Automatic and continuous transducer-drift compensator for endpoint detection systems
[PB82-135534] N82-28614
Miniature interferometer transducer: An optical system description and cost analysis
[DE82-004653] N82-29168

TRANSFER FUNCTIONS
Method and apparatus for transfer function simulator for testing complex systems
[NASA-CASE-NPO-15696-1] N82-28619
Fundamental developments for quantitative acoustic emission measurements
[DE82-901315] N82-29114

TRANSFERRING
A broadband waveguide transfer standard for the dissemination of UK national microwave power standards
[RSRE-MEMO-3390] N82-28498

TRANSITION FLOW
Experimental heat transfer coefficients for the cooling of oil in horizontal internal forced convective transitional flow
[PB82-142993] N82-28601

TRANSMISSION
Advances in high-speed rolling-element bearings
[NASA-TM-82910] N82-28644

TRANSMISSION LINES
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552

TRANSMISSIONS (MACHINE ELEMENTS)
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
Feasibility of electric vehicles in New Zealand. Appendices
[DE82-901431] N82-29236

TRANSMITTANCE
Atmospheric transmittance/radiance computer code FASCOD2
[AD-A113825] N82-28859
Infrared transmittance of marine atmospheres --- sea surface temperature
[AD-A114414] N82-29164

TRANSONIC FLOW
Computer program for calculating full potential transonic, quasi-three-dimensional flow through a rotating turbomachinery blade row
[NASA-TP-2030] N82-28247
Viscous effect on airfoils for unsteady transonic flows
[NASA-CR-166335] N82-28251
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263
Steady and unsteady transonic flow in a duct with a sudden enlargement
[MPIS-1/1982] N82-28599

TRANSONIC SPEED
Surface pressure measurements on a boattailed projectile shape at transonic speeds
[AD-A113520] N82-28258

TRANSONIC WIND TUNNELS
National Transonic Facility (NTF) prototype fan blade fatigue test
[AD-A114405] N82-28261
Streamlining the walls of an empty two-dimensional flexible-walled test section
[NASA-CR-165936] N82-28304
Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer
[AD-A112900] N82-28310
Design basis for a new transonic wind tunnel
[AD-A112899] N82-28311

TRANSPORT AIRCRAFT
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298

TRANSPORT PROPERTIES
Determination of the effect of composition, structure and electrochemical mass transport properties on adhesion and corrosion inhibition of paint films
[AD-A113975] N82-28448
Testing of a high capacity research heat pipe
[NASA-CR-167625] N82-28578

TRANSPORTATION
Slurry walls as an integral part of underground transportation structures
[PB82-145061] N82-29238

TRAPPED MAGNETIC FIELDS
Pioneer 10/11 data analysis of the trapped radiation experiment
[NASA-CR-166360] N82-28312

TRAPPED PARTICLES
Endor studies of radiation-produced trapped electrons and radicals in disordered systems and radical matrix interactions in polymers and on surfaces
[AD-A114321] N82-28455
Galactic radiation belts
[AD-A111836] N82-29244

TRAVELING WAVE TUBES
Multimode amplifier
[AD-A113254] N82-28557

TRIAXIAL STRESSES
The effect of stress triaxiality on the occurrence of ductile fracture in low strength steels
[DRIC-T-6493] N82-28663

TRINITROTOLUENE
TNT equivalency of Cyclotol 70/30
[AD-A113270] N82-28459

TROPICAL REGIONS
Vertical sections of temperature, salinity, thermosteric anomaly and zonal geostrophic velocity from NORPAX shuttle experiment, part 1
[PB82-163106] N82-28944

TROPICAL STORMS
Tropical cyclone motion: Environmental interaction plus a Beta effect
[ISSN-0067-0340] N82-28878
Statistical post-processing of the Navy nested tropical cyclone model and the operational tropical cyclone model
[AD-A114150] N82-28911

TROPOSPHERE
One-and two dimensional photochemical modeling of the chemical interactions in the middle atmosphere (0-120 km)
[PB82-156613] N82-28874

TRUNCATION ERRORS
Error propagation in stiff differential systems of singular perturbation type
[TRITA-NA-8108] N82-29091

TUNGSTEN ALLOYS
Tungsten alloy fabrication of penetrator materials
[AD-A114187] N82-28419

TUNING
Electronically tunable amplifier technology
[AD-A113193] N82-28555

TURBINE BLADES
Comparison of laser anemometer measurements and theory in an annular turbine cascade with experimental accuracy determined by parameter estimation
[NASA-TM-82860] N82-28250
Fast generation of three-dimensional computational boundary-conforming periodic grids of C-type --- for turbine blades and propellers
[NASA-CR-165596] N82-28253
Method of protecting a surface with a silicon-slurry/aluminide coating --- coatings for gas turbine engine blades and vanes
[NASA-CASE-LEW-13343-1] N82-28441

TURBINE ENGINES
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
TURBINES
CF6 jet engine performance improvement: High pressure turbine active clearance control
[NASA-CR-165556] N82-28297
TURBOCOMPRESSORS
Calibration and application of a combination temperature-pneumatic probe for velocity and rotor loss distribution measurements in a compressor
[AD-A113834] N82-28608
TURBOGENERATORS
Upstream H2S removal from geothermal steam
[DE82-901293] N82-28847
TURBOMACHINE BLADES
Computer program for calculating full potential transonic, quasi-three-dimensional flow through a rotating turbomachinery blade row
[NASA-TP-2030] N82-28247
TURBULENCE
Acoustic instabilities as a source of turbulence in reduced density channels
[AD-A114275] N82-28592
Laser anemometer using a Fabry-Perot interferometer for measuring mean velocity and turbulence intensity along the optical axis in turbomachinery
[NASA-TM-82841] N82-28605
TURBULENT BOUNDARY LAYER
Numerical algorithm for rapid integration of turbulence-model equations on elliptic regions
[AD-A113013] N82-28583
Study of turbulent boundary layers over rough surfaces with emphasis n the effects of roughness character and Mach number
[AD-A114217] N82-28588
TURBULENT FLOW
Monte Carlo calculations of two-dimensional combustor flows
[AD-A113780] N82-28374
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reacting flows
[NASA-CR-169124] N82-28576
Numerical simulation of wall-bounded turbulent shear flows
[NASA-TM-84259] N82-28577
Wall layer structure and drag reduction: Role of vicous sublayer
[AD-A112980] N82-28581
Numerical algorithm for rapid integration of turbulence-model equations on elliptic regions
[AD-A113013] N82-28583
Computation of turbulent horseshoe vortex flow past swept and unswept leading edges
[AD-A113534] N82-28584
Computation of laminar and turbulent flow in 90 deg square duct and pipe bends using the Navier-Stokes equations
[AD-A114258] N82-28589
VNAP2: A computer program for computation of two-dimensional, time-dependent, compressible, turbulent flow
[NASA-CR-169103] N82-28596
TURBULENT HEAT TRANSFER
Turbulent heating and filament structure of field-aligned current with anomaous resistivity
[REPT-680] N82-28855
Experimental studies of anomalous plasma heating in TORTUR 2
[REPT-82-141] N82-29200
TURBULENT MIXING
Research on augmentation of turbulent mixing
[AD-A114310] N82-28591
TURRET LATHES
Airborne laser turret flow control: A parametric study of wind tunnel model conditions
[AD-A113557] N82-28255
TWISTING
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279
TWO DIMENSIONAL FLOW
Monte Carlo calculations of two-dimensional combustor flows
[AD-A113780] N82-28374
VNAP2: A computer program for computation of two-dimensional, time-dependent, compressible, turbulent flow
[NASA-CR-169103] N82-28596
TWO PHASE FLOW
The dryout region in frictionally heated sliding contacts
[NASA-TM-82796] N82-28574

U

UDIMET ALLOYS
Effects of cobalt on the microstructure of Udimet 700
[NASA-CR-165605] N82-28409
ULTRAHIGH FREQUENCIES
A simulation system for validating the analytical prediction of performance of the convolutional encoded and symbol interleaved TDRSS S-band return link service in a pulsed RFI environment
[NASA-CR-170428] N82-28500
S-band radar pulse densities in the Los Angeles area
[AD-A114116] N82-28529
ULTRASONIC RADIATION
Applied stress determination using computerized ultrasonic techniques
[DE82-003894] N82-28681
ULTRASONIC TESTS
Trend inspection station for printed circuit board soler joints, ultrasonic subsystem
[AD-A112918] N82-28655
Applied stress determination using computerized ultrasonic techniques
[DE82-003894] N82-28681
ULTRASONICS
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260
ULTRAVIOLET ASTRONOMY
The first three years of IUE
[RL-81-091] N82-29242
UNDERGROUND EXPLOSIONS
Multi-frac test series
[DE82-004514] N82-28680
UNDERGROUND STORAGE
In-situ coal gasification of bituminous coals. A development plan
[DE82-002558] N82-28471
Technical and ecomic assessment of fluidized-bed-augmented compressed-air energy-storage system. Volume 1: Executive summary
[DE82-001894] N82-28822
Conceptual design and engineering studies of adiabatic Compressed Air Energy Storage (CAES) with thermal energy storage
[DE82-005483] N82-28823
Nevada nuclear waste storage investigations
[DE82-004722] N82-29150
UNDERGROUND STRUCTURES
Slurry walls as an integral part of underground transportation structures
[PB82-145061] N82-29238
UNDERWATER ACOUSTICS
Power spectra of geomagnetic fluctuations between 0.02 and 20 Hz
[AD-A113848] N82-28861
Ambient noise in the western Gulf of Mexico
[AD-A114126] N82-28931
Ocean current effects on marine seismic systems and deployments
[AD-A114135] N82-28934
Geology related to acoustic transmission: Eastern Caribbean
[AD-A114430] N82-28938
Computer support to NORDA codes 520 and 530
[AD-A114371] N82-29052
UNDERWATER ENGINEERING
Measurement methods for fluid shear stress
[AD-A113020] N82-28582
UNDERWATER PROPULSION
Underwater power source study
[AD-A112644] N82-28792
UNIFORM FLOW
Calculation procedure for sound propagation in a multisectional duct with uniform flow
[NLR-TR-79111-U] N82-29119
Calculation of sound suppression in a circular three-sectioned uniform flow duct
[NLR-TR-81002-U] N82-29120
UNSTEADY FLOW
Viscous effect on airfoils for unsteady transonic flows
[NASA-CR-166335] N82-28251
UNSTEADY STATE
Calculation of the unsteady pressure distribution on an oscillating cascade with thick profiles and steady turning angle
[DFVLR-FB-81-38] N82-28600
URANIUM
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 1
[DE82-005544] N82-28744
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745
Airborne gamma-ray spectrometer and magnetometer survey, New Rockford quadrangle, North Dakota
[DE82-005535] N82-28746
Airborne gamma-ray spectrometer and magnetometer survey: New Rockford quadrangle, North Dakota, Volume 2
[DE82-005569] N82-28747
Hydrogeochemical and stream sediment reconnaissance basic data for Sheridan quadrangle, Wyoming
[DE82-002467] N82-28748
Airborne gamma-ray spectrometer and magnetometer survey: Crescent quadrangle, Burns quadrangle, Canyon City quadrangle, Bend quadrangle, Salem quadrangle (Oregon)
[DE81-029063] N82-28749
Airborne gamma-ray spectrometer and magnetometer survey Coos Bay, Oregon, volume 1
[DE82-005534] N82-28750
Hydrogeochemical and stream sediment reconnaissance basic data for Ophir, Alaska
[DE82-000851] N82-28753
Hydrogeochemical and stream sediment reconnaissance basic data for Cheyenne quadrangle, Wyoming
[DE82-000786] N82-28754
Hydrogeochemical and stream sediment reconnaissance basic data for Preston quadrangle, Wyoming; Idaho
[DE82-000783] N82-28755
Hydrogeochemical and stream sediment reconnaissance basic data for Aztec Qaudrangle, New Mexico
[DE82-000853] N82-28760
Hydrogeochemical and stream sediment reconnaissance basic data for Brownfield quadrangle, New Mexico; Texas
[DE82-000855] N82-28762
Hydrogeochemical and stream sediment reconnaissance basic data for Dallas NTMS quadrangle, Texas
[DE82-000856] N82-28763
Airborne gamma-ray spectrometer and magnetometer survey, Roseburg Quadrangle, Oregon, volume 1
[DE82-005536] N82-28765
Radon diffusion through multilayer earthen covers: Models and simulations
[DE82-001420] N82-29138
URANIUM 235
Acquisition and performance evaluation of a quadrupole mass spectrometer in a mobile laboratory --- for isotopic analysis
[DE82-004668] N82-28611

URANIUM 238
Acquisition and performance evaluation of a quadrupole mass spectrometer in a mobile laboratory --- for isotopic analysis
[DE82-004668] N82-28611

URBAN PLANNING
Traffic capacity through work zones on urban freeways
[PB82-143009] N82-29239

URETHANES
Technical options for reducing chlorofluorocarbon emissions
[RAND-R-2879-EPA] N82-28840

USER MANUALS (COMPUTER PROGRAMS)
SD/LDEF technical User's Manual
[AD-A113504] N82-28324
Users manual for polar ice forecast subsystem: Arctic
[AD-A114351] N82-28932
FORTRAN static source code analyzer (SAP) user's guide
[NASA-TM-84786] N82-29021
Orbit determination software development for microprocessor based systems: Evaluation and recommendations
[NASA-TM-84794] N82-29028
Preliminary Automated Orbit Determination System (AODS)/AODS environment simulator for prototype testing (ADEPT) user's guide
[NASA-TM-84798] N82-29036
GPSPAC/LANDSAT-D Interface (GLI) system user's guide
[NASA-TM-84784] N82-29038
FORTRAN static source code analyzer program (SAP) user's guide, revision 1
[NASA-TM-84791] N82-29041
BGRAPH: A program for biplot multivariate graphics. Version 1: User's guide
[AD-A114449] N82-29051
Program listings for EOSAEL 80-B and ancillary codes AGAUS and FLASH. Volume 2: User's manual supplement
[AD-A114417] N82-29054
INPUTP (general purpose input processor). User guide
[AD-A114257] N82-29055
EOSMOD: A subroutine package for calculating equations of state and opacities
[DE82-004676] N82-29059
Program package for solving linear optimization problems. User's manual
[DE81-700125] N82-29065
MHD stability analysis code ERATO-J. User's manual of JAERI version ERATO
[DE81-700373] N82-29191

USER REQUIREMENTS
LMSS communication network design N82-28332
Data vs. information: A system paradigm N82-28732
Conept for a multiple resolution pushbroom sensor N82-28735
Development of a methodology for assessing aircrew workloads
[AD-A114364] N82-29010

UTILITIES
Survey of diesel generation by small US utilities
[DE82-901291] N82-28798
Photovoltaics and electric utilities --- capital investment and revenue requirement
[DE82-006994] N82-28833

UTILIZATION
Preliminary study of the possibilities for the use of glass fibers in hydrophones
[TPD-1981-0-2(105.106)] N82-29115

V

V GROOVES
Testing of a high capacity research heat pipe
[NASA-CR-167625] N82-28578

V/STOL AIRCRAFT
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249

VANADIUM ALLOYS
Thermotransport of hydrogen and deuterium in vanadium, niobium and tantalum alloys
[DE82-005453] N82-28424

VANES
Method of protecting a surface with a silicon-slurry/aluminide coating --- coatings for gas turbine engine blades and vanes
[NASA-CASE-LEW-13343-1] N82-28441

VAPOR PHASES
A numerical investigation of the dynamics of liquid spray
[AD-A113378] N82-28586
Solid state research
[AD-A114189] N82-29209

VAPOR PRESSURE
Hydraulic tests of tanks for dangerous goods --- determination of the test pressure
[SP-RAPP-1982:01] N82-28633

VAPORIZING
The high temperature thermochemical properties of carbon
[NASA-TM-84710] N82-28380

VAPORS
An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994

VARIANCE (STATISTICS)
Complete statistical ranking of populations, with tables and applications
[AD-A114400] N82-29098

VARIATIONAL PRINCIPLES
High-order terms in sensitivity analysis through a differential approach
[LA-8813-MS] N82-29072

VARISTORS
Processing and properties of Zn0 based varistors
[DE82-005583] N82-28565

VECTOR ANALYSIS
Mini raster-to-vector conversion
[AD-A113004] N82-28742
Acceleration of convergence of vector sequences
[NASA-TM-82931] N82-29075

VECTORS (MATHEMATICS)
Acceleration of convergence of vector sequences
[NASA-TM-82931] N82-29075

VELOCITY
Ocean current effects on marine seismic systems and deployments
[AD-A114135] N82-28934

VELOCITY MEASUREMENT
Comparison of laser anemometer measurements and theory in an annular turbine cascade with experimental accuracy determined by parameter estimation
[NASA-TM-82860] N82-28250
Method and apparatus for Delta K synthetic aperature radar measurement of ocean current
[NASA-CASE-NPO-15704-1] N82-28502
Laser anemometer using a Fabry-Perot interferometer for measuring mean velocity and turbulence intensity along the optical axis in turbomachinery
[NASA-TM-82841] N82-28605

VENTILATION
Modification of method for assaying ozone by the diacetyl dihydrolutidine reaction N82-28973

VERSATILITY
Cost effective communication with the electronic, microprocessor-controlled SPC telephone system EMS
[MBB-512-82-O] N82-28536
More ease in communication --- telephone system EMS 12,000
[MBB-513-82-O] N82-28537

VERTICAL ORIENTATION
Regulation of cerebral circulation in erect position N82-28637

VERTICAL PERCEPTION
Preparation of labyrinthectomied animals for flight aboard Cosmos-936 biosatellite N82-28971

VERY HIGH FREQUENCIES
Improved 243 MHz homing antenna system for use on helicopters
[NLR-MP-81022-U] N82-28276
Electromagnetic wave trajectories at VHF and higher frequencies
[PB82-134289] N82-28538

VERY LARGE SCALE INTEGRATION
Optimixing synchronous systems
[AD-A113916] N82-29015
Future computing
[RAND/P-6680] N82-29020

VESTIBULAR NYSTAGMUS
Nystagmometry of optovestibular interaction N82-28962

VESTIBULAR TESTS
Effect of caloric stimulation of vestibular system on hearing N82-28963
A procedure for the analysis of nystagmus and other eye movements
[AD-A112603] N82-28987

VESTIBULES
Effect of caloric stimulation of vestibular system on hearing N82-28963
Preparation of labyrinthectomied animals for flight aboard Cosmos-936 biosatellite N82-28971

VHF OMNIRANGE NAVIGATION
Evaluation of various navigation system concepts
[AD-A112919] N82-28275

VIBRATION
New sensor concepts: Low cost vibrating beam accelerometer
[AD-A113644] N82-28272

VIBRATION DAMPING
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-169131] N82-28282
Preliminary sizing of vibration absorber for space mast structures
[NASA-TM-84488] N82-28346
The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476
Damping in structural joints N82-28478
Arrangement for damping the resonance in a laser diode
[NASA-CASE-NPO-15980-1] N82-28618
The shock and vibration digest, volume 14, no. 5
[AD-A115091] N82-28659

VIBRATION EFFECTS
The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476
Current topics in rotordynamics research N82-28477
Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
[NASA-CR-3571] N82-28881
Vibration and assessment of this flight factor by pilots N82-28976

VIBRATION ISOLATORS
Limiting performance of nonlinear systems with applications to helicopter vibration control problems
[AD-A113239] N82-28301
Preliminary sizing of vibration absorber for space mast structures
[NASA-TM-84488] N82-28346
High temperature damping of dynamic systems N82-28661
Aseismic base isolation N82-28662

VIBRATION TESTS
The shock and vibration digest, volume 14, no. 4
[AD-A114448] N82-28673
The changing dimensions of qualification testing N82-28674
Analysis of measured structural frequency response data N82-28675

VIBRATIONAL STRESS
Effect of vibrational excitation on the dynamics of ion molecule reactions
[DE82-004951] N82-29135

VIDEO COMMUNICATION
Telidon Videotex presentation level protocol: Augmented picture description instructions
[CRC-TN-709-E] N82-28499
A virtual space video conferencing demonstration system
[AD-A114120] N82-28526
A multi-bit rate interface movement compensated multimode coder for video conferencing
[AD-A114121] N82-28527
Network specifications for a virtual space teleconferencing system
[AD-A114119] N82-28530

VIDEO DATA
IRIG-Time synchronized binary video data inserter
[AD-A107119] N82-28506
The digital step edge N82-28724

VIDEO DISKS
The design, development and application of advanced video and microcomputer-based command and control (C2) systems
[AD-A113742] N82-28511

VIEW EFFECTS
Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309
VINYL POLYMERS
Test methods for plastic windows --- Swedish standards
[SP-A-82:02] N82-28684
VIRTUAL MEMORY SYSTEMS
Virtual memory management
[SU-SLAC-244] N82-29014
VISCOELASTICITY
Studies of the dynamic and mechanical properties of thermoplastics by the split Hopkinson pressure bar method
[PH-130] N82-28443
An analysis of solid propellant transient viscoelastic response under motor ignition conditions
[AD-A114345] N82-28467
VISCOUS FLOW
Viscous effect on airfoils for unsteady transonic flows
[NASA-CR-166335] N82-28251
Wall layer structure and drag reduction: Role of vicous sublayer
[AD-A112980] N82-28581
VISIBILITY
Critical assessment of a series of lidar aerosol measurement results
[DFVLR-FB-82-03] N82-28853
VISIBLE SPECTRUM
A Fourier transform spectrometer for visible and near ultra-violet measurements of atmospheric absorption
[NASA-TM-73297] N82-28606
VISION
Long-term and progressive changes in Rhesus spectral sensitivity after low-level coherent light (514nm exposure) --- effects of laser exposure on visual function
[AD-A111639] N82-28946
Cold weather goggles. 2: Performance evaluation
[AD-A114067] N82-29008
VISUAL ACUITY
Determining visual acuity thresholds: A simulation study of stimulus presentation strategies
[AD-A111821] N82-28992
VISUAL AIDS
Development of slide program describing site-selection process for Small Wind Energy Conversion Systems (SWECS)
[DE82-006209] N82-28831
Unconventional visual displays for flight training
[AD-A111392] N82-28999
VISUAL DISCRIMINATION
The ranking of displays based on transinformation --- as a measure of tracking performance
[FB-52] N82-29001
VISUAL PERCEPTION
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292
Visual Technology Research Simulator (VTRS) human performance research: Phase 3
[AD-A112475] N82-28988
Determining visual acuity thresholds: A simulation study of stimulus presentation strategies
[AD-A111821] N82-28992
Cold weather goggles. 2: Performance evaluation
[AD-A114067] N82-29008
Sight distance requirements at lane closure work zones on urban freeways
[PB82-142290] N82-29240
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260
VISUAL STIMULI
Determining visual acuity thresholds: A simulation study of stimulus presentation strategies
[AD-A111821] N82-28992
VOCODERS
Development of a good-quality speech coder for transmission over noisy channels at 2.4 kb/s
[AD-A114068] N82-28510
Maximum likelihood spectral estimation and its application of narrowband speech coding
[AD-A114070] N82-28513
VOICE COMMUNICATION
Development of a good-quality speech coder for transmission over noisy channels at 2.4 kb/s
[AD-A114068] N82-28510
Computer-generated speech
[DE82-004672] N82-29063
VOICE DATA PROCESSING
Maximum likelihood spectral estimation and its application of narrowband speech coding
[AD-A114070] N82-28513
VOLCANOLOGY
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689
VOLT-AMPERE CHARACTERISTICS
The application of a bubbling mercury electrode to anodic stripping voltammetry. Determination of zinc, cadium, lead and copper in natural water and industrial waste
[DRIC-T-6565] N82-28791
VOLTAGE CONVERTERS (DC TO DC)
A dc to dc converter --- raising battery voltage in an ion propulsion system
[NASA-CASE-MFS-25430-1] N82-28550
VOLTAGE REGULATORS
Solid-state high common-mode battery cell voltage scanner: Design report
[DE82-007032] N82-28569
VOLTERRA EQUATIONS
Detection, estimation, and control on group manifolds
[AD-A113019] N82-29107
VOLUME
Traffic capacity through work zones on urban freeways
[PB82-143009] N82-29239
VORTEX RINGS
Experimental investigation of the circulation and the propagation of macroscopic ring vortices in He 2
[MPIS-16/1981] N82-28598
VORTICES
Computation of turbulent horseshoe vortex flow past swept and unswept leading edges
[AD-A113534] N82-28584
Research on augmentation of turbulent mixing
[AD-A114310] N82-28591
A method for the circulation of invariant manifolds in hydrodynamic stability problems
[PB82-158825] N82-28603
VORTICITY EQUATIONS
Tropical cyclone motion: Environmental interaction plus a Beta effect
[ISSN-0067-0340] N82-28878
VULCANIZED ELASTOMERS
Chemical design of elastomeric behavior
[AD-A114335] N82-28454

W

WAFERS
Improved ingot slicing machine
[NASA-CASE-NPO-15483-1] N82-28642
Method of Fabricating Schottky Barrier solar cell
[NASA-CASE-NPO-13689-4] N82-28780
WALL FLOW
Measuring the flow properties of slotted test-section walls
[FFA-135] N82-28571
Numerical simulation of wall-bounded turbulent shear flows
[NASA-TM-84259] N82-28577
WALLS
Coupled walls in earthquake-resistant building: Parametric investigation and design procedure
[PB82-147901] N82-28487
Structural walls in earthquake-resistant buildings: Dynamic analysis of isolated structural walls. Development of design procedure: Design force levels
[PB82-147794] N82-28488
Wall layer structure and drag reduction: Role of vicous sublayer
[AD-A112980] N82-28581
Study of turbulent boundary layers over rough surfaces with emphasis n the effects of roughness character and Mach number
[AD-A114217] N82-28588
Slurry walls as an integral part of underground transportation structures
[PB82-145061] N82-29238
WASHING
Thermal analysis of SYNROC gel microspheres
[DE82-003472] N82-28399
WASTE DISPOSAL
The effects of lease size on yields from oil shale surface mines
[RAND/N-1798-DOE] N82-28697
Interpretation of time-domain electromagnetic soundings in the Calico Hills area, Nevada Test Site, Nye County, Nevada
[DE82-004260] N82-28869
US Geological Survey research in radioactive waste disposal, fiscal year 1979
[USGS-CIRC-847] N82-29145
Monitoring technologies for ocean disposal of radioactive waste
[RAND/R-2773-NOAA] N82-29146
Non-US advanced low-level radwaste treatment systems
[DE82-900852] N82-29148
Nevada nuclear waste storage investigations
[DE82-005879] N82-29149
Nevada nuclear waste storage investigations
[DE82-004722] N82-29150
Long-term high-level defense waste technology
[DE82-005755] N82-29151
Energy and solid/hazardous waste
[DE82-006964] N82-29152
Deposition of highly active nuclear wastes
[TUM-LRT-TB-81/3] N82-29153
Requirements and alternatives for a management information system to support hazardous waste enforcement
[PB82-154410] N82-29231
Future satellite carriers --- best choice for a carrier rocket for the 90's
[TUM-LRT-TB-81/6] N82-29248
WASTE TREATMENT
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689
Integration of processes for wastewater residuals management
[PB82-147992] N82-28854
Non-US advanced low-level radwaste treatment systems
[DE82-900852] N82-29148
WASTE UTILIZATION
Evaluation of potential processes for recovery of metals from coal ash. Volume 2: Laboratory data and cost estimates
[DE82-005592] N82-28428
WASTES
Energy and solid/hazardous waste
[DE82-006964] N82-29152
WATER
Continuum absorption by H2O
[AD-A112264] N82-28372
Effect of applied stress, thermal environment and water in epoxy resins
[AD-A113016] N82-28450
Entrainment modelling of buoyant momentum jets in water
[AD-A112797] N82-28580
WATER CIRCULATION
The dynamics of mean circulation on the continental shelf
[PB82-157082] N82-28943
WATER CONSUMPTION
Verification of the potential yield and chemical quality of the allow dolomite aquifer in DuPage County, Illinois
[PB82-158361] N82-28779
WATER CURRENTS
Marine sciences group
[DE82-005145] N82-28940
WATER HEATING
NBS/ESDS: A computer model for the simulation of hot water systems
[PB82-139361] N82-28492
Solar energy system performance evaluation: Summerwood Associates, House G, Old Saybrook, connecticut, June 1980 - May 1981
[DE82-004408] N82-28806
Solar project description for Saddle Hill Trust: Lot 77, single family residence, Medway, Massachusetts
[DE82-003326] N82-28807
WATER MANAGEMENT
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689
A Rand note: Policy analysis of water management for the Netherlands. Volume 3: Screening of eutrophication control tactics
[RAND/N-1500/3-NETH] N82-28691

A Rand note: Policy analysis of water management for the Netherlands. Volume 16: Costs for infrastructure tactics
[RAND/N-1500/16-NETH] N82-28692
A Rand note: Policy analysis of water management for the Netherlands. Volume 17: Flood safety model for the Ijssel Lakes --- dike safety
[RAND/N-1500/17-NETH] N82-28693
A Rand note: Policy analysis of water management for the Netherlands. Volume 18: Sedimentation and dredging cost models
[RAND/N-1500/18-NETH] N82-28694
Integration of processes for wastewater residuals management
[PB82-147992] N82-28854

WATER POLLUTION
The application of a bubbling mercury electrode to anodic stripping voltammetry. Determination of zinc, cadium, lead and copper in natural water and industrial waste
[DRIC-T-6565] N82-28791
Integration of processes for wastewater residuals management
[PB82-147992] N82-28854
Microorganisms used to monitor environmental pollution N82-28978
Monitoring technologies for ocean disposal of radioactive waste
[RAND/R-2773-NOAA] N82-29146

WATER QUALITY
Biota and biological principles of the aquatic environment
[CIRC-848-A] N82-28688
Sampling frequency for water quality monitoring
[PB82-145343] N82-28770
Water resources data for Mississippi, water year 1980
[PB82-149006] N82-28773
Water resources data for West Virginia, water year 1980. Appendix: Coal areas
[PB82-159674] N82-28778

WATER RESOURCES
Water resources data for Mississippi, water year 1980
[PB82-149006] N82-28773
Water resources data for Alabama, water year 1980. Volume 1: Apalachicola Choctawatchee, Blackwater, Escambia, Perdidio, and Alabama River Basins
[PB82-164112] N82-28777
Water resources data for West Virginia, water year 1980. Appendix: Coal areas
[PB82-159674] N82-28778

WATER RUNOFF
Mathematical models of water yield with particular reference to Mississippi watersheds. Mathematical modeling of watershed yield
[PN82-157868] N82-28772

WATER TEMPERATURE
Biota and biological principles of the aquatic environment
[CIRC-848-A] N82-28688

WATER TREATMENT
Zeta potential study of the water treatment of geothermal brines
[DE82-005910] N82-28849
Integration of processes for wastewater residuals management
[PB82-147992] N82-28854

WATER VAPOR
High resolution spectral absorption in the short wavelength wing of the 2.7-micrometer water band at 1,000 K
[AD-A114156] N82-28383
Alkali halide FLIR lens development
[AD-A113845] N82-29158

WATER WAVES
Scientific opportunities using satellite wind stress measurements over the ocean
[NASA-CR-169100] N82-28879
Measurements of whitecap coverage and surface winds over the Gulf of Mexico loop current
[AD-A114429] N82-28937

WATERSHEDS
Snow barrier potential for harvesting moisture in transects across Chinook areas in Montana
[PB82-157926] N82-28771
Mathematical models of water yield with particular reference to Mississippi watersheds. Mathematical modeling of watershed yield
[PN82-157868] N82-28772

WAVE ATTENUATION
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624

WAVE FRONTS
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292

WAVE FUNCTIONS
Instantons in the quark plasma. The role of Fermion zero modes
[REPT-677] N82-29174

WAVE PROPAGATION
LMSS telecommunication network design N82-28327
MSAT design N82-28328
Electromagnetic wave trajectories at VHF and higher frequencies
[PB82-134289] N82-28538
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111

WAVEFORMS
Measurement and use of the plasma current waveform in an RF silane discharge
[DE82-005119] N82-28566

WAVEGUIDES
A broadband waveguide transfer standard for the dissemination of UK national microwave power standards
[RSRE-MEMO-3390] N82-28498

WEAPON SYSTEMS
Kinematic investigation Hughes Helicopter 7.62mm chain gun
[AD-A113114] N82-28287
Six-degree-of-freedom (6-DOF) simulator for weapon testing
[AD-A113536] N82-28308
Identification of requirements for atmospheric data --- to determine nuclear explosion effects on weapon systems
[AD-A113640] N82-28886
Particle beam weapons
[AD-A114383] N82-29147
Concepts, the Journal of Defense Systems Acquisition Management, Autumn 1981, volume 4, number 4
[AD-A113130] N82-29220
Study of increasing lead times in major weapon systems acquisition
[AD-A113459] N82-29221

WEAR
The dryout region in frictionally heated sliding contacts
[NASA-TM-82796] N82-28574

WEATHER
Terrestrial environment (climatic) criteria guidelines for use in aerospace vehicle development
[NASA-TM-82473] N82-28317
New look at long-term collector performance and utilizability
[DE82-005259] N82-28799
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Randolph AFB, San Antonio, Texas. Parts A-F
[AD-A113704] N82-28887
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Taegu AB, Korea. Parts A, C-F
[AD-A113228] N82-28889
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Lajes AB, Azores. Parts A-F
[AD-A113227] N82-28890
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Forbes Fld, Kansas. Parts A-F
[AD-A113226] N82-28891
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Thule AB, Greenland. Parts A-F
[AD-A113225] N82-28892
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Burlington IAP, Vermont. Parts A-F
[AD-A113224] N82-28893
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Atlantic City, New Jersey. Parts A-F
[AD-A113180] N82-28894
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Scott AFB, Belleville, Illinois. Parts A-F
[AD-A113177] N82-28897
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Amarillo MAP, Texas. Parts A-F
[AD-A113176] N82-28898
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Edmonton IAP, Alberta, Canada. Parts A-F
[AD-A113175] N82-28899
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Nellis AFB, Las Vegas, Nevada. Parts A-F
[AD-A113154] N82-28900
Revised Uniform Summary of Surface Weather Observations (RUSSWO). McConnell AFB, Wichita, Kansas. Parts A-F
[AD-A113155] N82-28901
Climatology tables for 7 Corps forward areas
[AD-A113034] N82-28902

WEATHER FORECASTING
Terminal forecast reference notebook, Osan AB, Korea
[AD-A107433] N82-28882
Terminal forcast reference notebook, Camp Casey, Korea
[AD-A107432] N82-28883
Terminal Forecast Reference Notebook, Fresno Air Terminal, California
[AD-A107434] N82-28884
East Coast fog: A case study
[AD-A113110] N82-28903
Storm warnings on Lake Balaton
[AD-A114322] N82-28909
Operations of the National Weather Service
[PB82-161829] N82-28927

WEATHER STATIONS
A design study for a meteorological instrumentation system for an Omega tower
[AD-A112868] N82-28906

WEDGE FLOW
Gas-driven fracture propagation
[DE82-003079] N82-28870

WEIGHTLESSNESS
Preparation of labyrinthectomied animals for flight aboard Cosmos-936 biosatellite N82-28971
Methodological aspects of testing erythrocyte balance by counting incubated reticulocytes N82-28972
NASA report to educators, volume 10, no. 1 N82-29216

WEIGHTLESSNESS SIMULATION
Endurance of +Gz G forces by middle-aged people before and after 7-day immersion N82-28958
Efficacy of kavirion in prevention of motion sickness N82-28961

WELDABILITY
Comparison of laser welds in two stainless steels
[DE82-004699] N82-28651

WELDED JOINTS
External loads on nozzles in cylindrical shells
[CRIF-MT-146] N82-28687

WELDING
A first report on welding diagrams
[PB82-134602] N82-28653

WELLS
Multi-frac test series
[DE82-004514] N82-28680
Water resources data for Alabama, water year 1980. Volume 1: Apalachicola Choctawatchee, Blackwater, Escambia, Perdidio, and Alabama River Basins
[PB82-164112] N82-28777
Verification of the potential yield and chemical quality of the allow dolomite aquifer in DuPage County, Illinois
[PB82-158361] N82-28779

WEST VIRGINIA
Water resources data for West Virginia, water year 1980. Appendix: Coal areas
[PB82-159674] N82-28778

WETTING
Advanced machinery liquid metal wetting, cleaning and materials compatibility study
[AD-A113294] N82-28480

WIDEBAND COMMUNICATION
Frequency compression of wideband signals using a distributed sampling technique
[AD-A113428] N82-28519

WIND (METEOROLOGY)
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Randolph AFB, San Antonio, Texas. Parts A-F
[AD-A113704] N82-28887
Local and regional winds: Their names and attributes
[AD-A114224] N82-28908
Storm warnings on Lake Balaton
[AD-A114322] N82-28909
Bulletin of hydrological and meteorological Service, selected articles
[AD-A114382] N82-28910
WIND EFFECTS
Scientific opportunities using satellite wind stress measurements over the ocean
[NASA-CR-169100] N82-28879
WIND PROFILES
Identification of requirements for atmospheric data --- to determine nuclear explosion effects on weapon systems
[AD-A113640] N82-28886
WIND SHEAR
A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265
Identification of requirements for atmospheric data --- to determine nuclear explosion effects on weapon systems
[AD-A113640] N82-28886
Surface stress estimation for study of the circulation dynamics of the Gulf of Mexico
[AD-A114349] N82-28936
WIND TUNNEL MODELS
Research model wing/tail fabrication --- transonic wind tunnel 1/7.5-scale model
[AD-A114101] N82 28288
WIND TUNNEL TESTS
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252
Wind-tunnel evaluation of an aeroelastically conformable rotor
[AD-A114384] N82-28260
Study of boundary-layer transition using transonic cone Preston tube data
[NASA-CR-169130] N82-28579
WIND TUNNEL WALLS
Streamlining the walls of an empty two-dimensional flexible-walled test section
[NASA-CR-165936] N82-28304
Measuring the flow properties of slotted test-section walls
[FFA-135] N82-28571
WIND TURBINES
Capturing energy from the wind
[NASA-SP-455] N82-28783
Wind and solar powered turbine
[NASA-CASE-NPO-15496-1] N82-28784
Economic analysis of small wind-energy-conversion systems for ten MASEC sites
[DE82-003976] N82-28815
WIND VELOCITY
Environmental data for sites in the National Solar Data Network, October 1981
[DE82-002706] N82-28850
Fine scale structures in time and space of rainfall rate --- Sweden
[FOA-C-20448-E2] N82-28919
WIND VELOCITY MEASUREMENT
Scientific opportunities using satellite wind stress measurements over the ocean
[NASA-CR-169100] N82-28879
WINDOWS (APERTURES)
Test methods for plastic windows --- Swedish standards
[SP-A-82:02] N82-28684
WINDPOWER UTILIZATION
Capturing energy from the wind
[NASA-SP-455] N82-28783
Study of a wind energy conversion system in New Hampshire
[AD-A114418] N82-28795
Wind resource analysis for the Tennessee Valley authority region, volume 1
[DE82-004927] N82-28913
Wind energy resource atlas. Volume 2: TVA power service area
[DE82-004877] N82-28914
Wind resource analysis for the Tennessee Valley authority region, volume 3
[DE82-006196] N82-28915
Wind resource analysis for the Tennessee Valley authority region, volume 4
[DE82-005103] N82-28916
WINDPOWERED GENERATORS
Study of a wind energy conversion system in New Hampshire
[AD-A114418] N82-28795
Economic analysis of small wind-energy-conversion systems for ten MASEC sites
[DE82-003976] N82-28815
Development of slide program describing site-selection process for Small Wind Energy Conversion Systems (SWECS)
[DE82-006209] N82-28831
WING TIPS
Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
[NASA-CR-3571] N82-28881
WINGS
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279
WINTER
Winter MONEX US research flight missions, December 1978
[PB82-158767] N82-28929
WOOD
Economic summary of woody biomass direct combustion and gasification alternatives
[DE82-003140] N82-28816
WORK
Traffic capacity through work zones on urban freeways
[PB82-143009] N82-29239
WORK CAPACITY
Problem of accelerations in aviation medicine
N82-28950
Sleep, circadian cycles of physiological functions and parameters of human work capacity on first day after changing from altered to usual sleep-waking cycle
N82-28951
On models and methods for performance measurement
[AD-A113578] N82-28998
Flight crewmember workload evaluation
[AD-A114167] N82-29012
WORK-REST CYCLE
Flight crewmember workload evaluation
[AD-A114167] N82-29012
WORKING FLUIDS
Thermochemical generation of hydrogen
[NASA-CASE-NPO-15015-1] N82-28368
The influence of the working fluid on a turbine and Rankine cycle design efficiency
[MBB-UR-535-82-O] N82-28652
WORKLOADS (PSYCHOPHYSIOLOGY)
Special investigation report: Air traffic control system
[PB82-136276] N82-28277
Development of a methodology for assessing aircrew workloads
[AD-A114364] N82-29010
WROUGHT ALLOYS
Fatigue crack propagation thresholds for long and short cracks in Rene 95 nickel-base superalloy
[DE82-005135] N82-28422

X

X RAY ABSORPTION
Chemical structure by laser-produced X-rays
[AD-A113864] N82-28627
X RAY ANALYSIS
Investigations on the nature and reactivity of compounds formed between lithium and carbon black
[AD-A113116] N82-28378
X RAY ASTRONOMY
Activities report of the Institute for Extraterrestrial Physics
[MPI-PAE/EXTRATERR-172] N82-29245
X RAY DIFFRACTION
FORTRAN 4 program for calculating X-ray powder diffraction patterns version 9/10
[DE82-003893] N82-29062
X RAY SOURCES
Comptonization of photons in compact cosmic X-ray sources
[MPI-PAE/EXTRATERR-171] N82-29171
X RAY SPECTROSCOPY
Spot spectroscopy: Local spectroscopic measurements within laser produced plasmas
[AD-A114165] N82-29180

Y

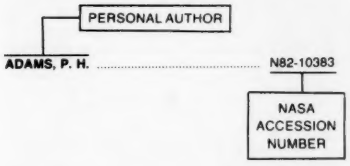
YAG LASERS
Preparation of rare earth doped YAG laser materials
[AD-A113608] N82-28623
The choice of a laser for airborne depth sounding
[AD-A112901] N82-28629
Evaluation of the performance of a laser for airborne depth sounding
[AD-A112907] N82-28630

Z

ZETA PINCH
Ion motion in the plasma focus
[IPF-81-11] N82-29198
ZIEGLER CATALYST
An SCF-X alpha-SW molecular-orbital study of a possible reaction path for Ziegler-Natta catalysts
[AD-A113559] N82-28373
ZINC COATINGS
Galvanically precipitated aluminum: A new material --- for protective coating
[MBB-515-82-O] N82-28431
ZINC OXIDES
Processing and properties of Zn0 based varistors
[DE82-005583] N82-28565

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

AAGREN, C. H. N82-28613
ABBOTT, J. M. N82-28249
ABELSON, J. N82-28566
ABRAHAMSE, A. F. N82-28693
ABRAMSON, H. N. N82-28674
ABRIKOSOV, A. A., JR. N82-29174
ABU-MOSTAFA, A. N82-28579
ACKERMAN, F. J. N82-28764
ACTIS, R. N82-28554
ADELFANG, S. I. N82-29094
ADLAKHA, V. N82-29022
AFONIN, B. B. N82-28952
AGARWAL, A. K. N82-28471
AIMAN, W. R. N82-28468
AIMTHIKUL, Y. N82-29063
AKHMEDOV, R. N82-28975
AKKARI, S. H. N82-28881
ALBERT, C. E. N82-29246
ALBERT, W. C. N82-28272
ALEKSEUEV, Y. I. N82-28971
ALFEROVA, I. V. N82-28954
ALI, A. W. N82-28864
ALLEN, J. N82-28553
ALLEN, R. N82-28708
ALSPAUGH, T. A., JR. N82-29022
AMOS, D. E. N82-29085
ANANDA, M. N82-28719
ANCTIL, A. A. N82-28412
ANDERSON, J. S. N82-28599
ANDERSON, K. W. N82-28265
ANDERSON, R. H. N82-29158
ANDERSON, S. L. N82-29135
ANDO, K. J. N82-28716
ANDREYEVA, V. G. N82-28958
ANICHIN, V. F. N82-28971
ANISIMOV, B. V. N82-28973
ANSTEY, G. J. N82-28856
ANTONSEN, T. M., JR. N82-29179
ANUTA, P. N82-28723
ANZIMIROV, V. L. N82-28957
APFEL, R. E. N82-29113
APICELLA, A. N82-28450
APPLEWHITE, H. L. N82-29069
APRUZESE, J. N82-29177
ARAVIND, P. K. N82-28384
ARGUEDEN, R. Y. N82-29073
ARMIJO, J. R. N82-28818
ARMSTRONG, A. N82-29083
ARMSTRONG, R. D. N82-29011
ARP, V. N82-28574
ARSLANOVA, R. M. N82-28956
ARTAMONOVA, N. P. N82-28958
ASHBY, M. F. N82-28653
ASSELINEAU, L. N82-28602
ATTMANNSPACHER, W. N82-28858
AUNGST, W. P. N82-28465
AUXIER, J. A. N82-28995
AVI-ITZHAK, B. N82-29106
AXFORD, R. N82-28517
AXNAES, I. N82-29195
AYZIKOV, G. S. N82-26971
AZUMI, M. N82-29191

B

BAGCI, C. N82-28660
BAGDASARYAN, G. A. N82-28978
BAINUM, P. M. N82-28345
BAKER, M. A. N82-28797
BAKER, R. L. N82-28380
BALASIS, M. N82-28556
BALAZA, A. C. N82-28373
BALDWIN, G. C. N82-29142
BALL, E. D. N82-28521
BANDY, S. N82-28551
BANKS, B. A. N82-28440
N82-28445
BANNISTER, J. A. N82-29022
BARANY, J. W. N82-29010
BARATTA, F. I. N82-28447
BARCELONA, M. J. N82-28770
BARMATZ, M. B. N82-29112
BARNES, G. R. N82-28987
BARNES, J. C. N82-28774
BARRETT, D. L. N82-29202
BARZILAI, J. N82-29082
BASCI, M. N82-29238
BATEH, E. J. N82-28415
BATTEH, J. H. N82-29125
BAUMGARDNER, J. N82-28866
BEARD, M. W. N82-28861
BEARDS, C. F. N82-28478
BEAUBIEN, L. A. N82-28607
BECK, P. N82-29083
BECK, T. R. N82-28448
BECKER, D. N82-28655
BECKER, H. N82-29188
BECKER, J. J. N82-29109
BECKTELL, M. J. N82-29223
BEELBY, M. H. N82-28414
BEIRLANT, J. N82-29098
BELT, R. F. N82-28623
BENEVOLENSKIY, V. N. N82-28956
BENNETT, G. A. N82-28390
BENSON, C. R. N82-28779
BERGDAL, H. N82-28613
BERNAS, H. N82-29211
BERNDT, S. B. N82-28571
BERNSTEIN, R. N82-28738
BEROUTI, M. N82-28510
BERTALOT, L. N82-29197
BERTSCHE, W. R. N82-28271
BETZINA, M. D. N82-28252
BEYER, E. N82-28729
BHARTIA, P. K. N82-28880
BICHLER N82-29154
BIEGELSON, D. K. N82-29213
BIKSON, T. K. N82-29224
BILD, R. W. N82-28818
BILLET, M. L. N82-28587
BILLINGSLEY, F. C. N82-28700
N82-28732
N82-28733
N82-28735
N82-28736
BILOW, H. J. N82-29127
BIRD, R. E. N82-28825
BISHOP, C. B. N82-29146
BITTKER, D. A. N82-28460
BLACK, N. F. N82-28367
BLACKFIELD, D. N82-29184
BLACKWELL, F. N. N82-28912
BLANCHARD, A. N82-28559
BLEIWAS, D. I. N82-28769
BLOWER, D. J. N82-28992
BOCHNIG, W. N82-28536
BODNAR, L. L. N82-28523
BODO, D. N82-28961
BODVARSSON, G. N82-28766
BOES, G. N82-28364
BOETTINGER, W. J. N82-28411
BOGARD, D. G. N82-28581
BOISVERT, R. N. N82-28475
BOLDT, T. R. N82-28284
BOLHOFER, W. N82-28923
N82-28929
BORENSTEIN, S. R. N82-29170
BORNER, H. N82-28598
BOROWSKI, S. K. N82-29184
BOSSER, J. N82-29136
BOTT, J. F. N82-28635
BOWEN, V. T. N82-28942
BOWLEY, C. J. N82-28774
BOYD, J. D. N82-28934
BOYLE, P. J. N82-28386
BOZDOGAN, H. N82-29080
BRACCO, F. V. N82-28403
BRAGGINS, T. T. N82-29202
BRAMMER, D. J. N82-28497
BRANDT, H. E. N82-29176
BRATRICE, E. S. N82-28946
BRAUER, R. L. N82-28518
BRAUN, J. N82-28574
BRECHT, S. N82-29181
BRECKENRIDGE, F. R. N82-29114
BRENCH, B. L. N82-28832
BRENNER, A. N82-28404
BRESLAV, I. S. N82-28964
BRIGHT, R. N82-28833
BRILEY, W. R. N82-28584
N82-28589
BRINKLEY, J. W. N82-28267
BRISBANE, T. E. N82-28377
BRITTON, K. H. N82-29048
BROLIN, H. N82-28684
BROMBERG, L. N82-29188
BROWN, H. C. N82-28449
BROWN, H. G. N82-28499
BROWN, R. T. N82-28634
BROWNING, T. I. N82-28546
BRUNNER N82-29154
BRYANT, N. A. N82-28699
BRYANTSEVA, L. A. N82-28964
BRYSON, M. C. N82-29071
BUCHLIN, J. M. N82-28585
N82-28586
N82-28793
BUCK, J. R. N82-29010
BUGGEIN, R. C. N82-28589
BUNNIK, N. J. J. N82-28767
BURCH, D. E. N82-28372
BURKE, H. H. K. N82-28774
BURKHALTER, P. G. N82-29180
BURKOVAKAYA, T. Y. N82-28972
BURNETT, T. A. N82-28846
BURNS, R. L. N82-28355
BURROW, G. C. N82-28480
BUSSGANG, J. J. N82-28505
BUTTRAM, M. T. N82-28570
BUTTRILL, S. E., JR. N82-28466
BYERS, R. K. N82-28819

C

CAHN, J. W. N82-28411
CALISE, J. A. N82-29201

CALLOWAY, A. R. N82-28632
CAMPBELL, B. E. N82-28627
CAMPBELL, J. H. N82-28764
CAMPBELL, W. J. N82-28740
CANNON, P. H. N82-28569
CANON, R. M. N82-28428
CAPRIO, J. M. N82-28771
CARBONNEAU, R. N82-28559
CARD, M. F. N82-28346
CARLEY, J. F. N82-28764
CARLSSON, B. N82-28485
CARMICHAEL, I. C. N82-29156
CARON, G. N82-29045
CARR, R. W. N82-29014
N82-29061
CARR, R. W., JR. N82-28407
CARSTENS, V. N82-28600
CARTER, J. A. N82-28611
CARTER, R. C. N82-29000
CARTER, W. P. L. N82-28842
N82-28843
CARTWRIGHT, W. D. N82-28905
CASSINELLI, J. N82-28349
CAVALERI, V. F. N82-28520
CHAI, Y. N82-28551
CHAMBERS, M. N82-28923
N82-28929
CHAN, L. Y. N82-28839
CHANDA, K. C. N82-28514
CHANDLER, J. A. N82-28318
CHANG, I. D. N82-28572
N82-29111
CHANG, S. H. N82-28646
CHARNES, A. N82-29101
N82-29105
CHARNES, R. D. N82-29011
CHATFIELD, R. E. N82-29097
CHATURVEDI, S. K. N82-28805
CHAUMONT, J. N82-29211
CHAVEZ, P. S., JR. N82-28710
CHEN, C. K. N82-28865
CHEN, H. N82-28473
CHEN, J. N82-28389
CHEN, T. Y. N82-28375
CHI, M. N82-29238
CHINITZ, W. N82-28576
CHMURA, L. J. N82-29048
CHOFFE, B. N82-28602
CHOYKE, W. J. N82-29124
CHRISTE, K. O. N82-28382
CHRISTENSEN, E. N82-28993
CHRISTENSON, J. N82-28698
CHUANG, C. A. N82-28516
CHUNG, S. N82-29130
CHUNG, T. J. N82-28676
CICCIO, J. A. N82-28562
CLARK, B. A. J. N82-28265
CLEMENTS, P. C. N82-29048
CLINE, M. C. N82-28596
CLOUGH, R. B. N82-29114
COCHRAN, J. K. N82-28942
COGLEY, A. C. N82-28859
COHEN, C. N82-28490
COHEN, R. E. N82-28458
COHEN, S. N82-28426
COHN, D. R. N82-29184
N82-29188
COLBURN, W. S. N82-28292
COLE, E. R., JR. N82-28437
COLLYER, S. C. N82-28999
COLVOCORESES, A. P. N82-28734
CONNOLLY, J. M. N82-28307
CONNOLLY, T. J. N82-29106
CONWAY, L. J. N82-28519
COOK, G. R. N82-28295
COOK, I. D. N82-28304
COOLEY, L. A. N82-28417
COOPER, W. W. N82-29101
N82-29105
CORBETT, E. N82-28467
CORIELL, S. R. N82-28411
CORLEY, W. G. N82-28487
N82-28488
CORNWELL, D. N82-29045
COSDEN, T. H. N82-28631
COSPITO, M. N82-28791
COVINGTON, M. A. N82-28380
COWELL, T. N82-28558
COX, R. A. N82-28288
COX, W. J. N82-29012
COY, J. J. N82-28643
N82-28645
N82-28646
CRAIG, J. E. N82-28624
CRANE, K. C. A. N82-28354
CRANE, R. K. N82-28742
CREIGHTON, J. R. N82-28470
CRONIN, M. J. N82-28243
CROOKER, T. W. N82-28417
CROWE, D. A. N82-29157
CSANADY, G. T. N82-28941
CULLEN, D. E. N82-29139
CURLANDER, J. C. N82-28717
CURRIE, J. R. N82-28545
CURTIS, P. M. N82-28403

D

DAHLBERG, E. D. N82-29215
DAHLMAN, O. N82-28613
DAHLQUIST, G. N82-29091
DALTON, B. N82-28531
DALTON, J. T. N82-28711
DANIELS, E. N82-28613
DANTZIG, G. B. N82-29106
DARA, P. N82-28355
DAS, D. N82-28649
DAS, S. N82-28540
DASHIN, S. A. N82-28968
DAULERIO, L. A. N82-28989
DAVEY, C. T. N82-28461
DAVIDOFF, R. L. N82-28769
DAVIES, L. M. N82-28504
DAVIS, M. R. N82-28556
DAVIS, P. R. N82-29203
DAVIS, R. C. N82-28665
DEADMORE, D. L. N82-28441
DEAN, E. H. N82-28261
DEBARBADILLO, J. J. N82-28436
DEBRACHO, E. O. N82-28565
DECHAUMPHAI, P. N82-28666
DECKER, W. J. N82-29034
DECOCK, J. N82-28687
DEHAVEN, J. C. N82-28691
DEIS, D. W. N82-28524
DEKONING, A. U. N82-28685
DELAHAY, P. N82-29126
DELENE, J. G. N82-28821
DEMARY, T. E. N82-28931
DEMEYER, K. M. N82-29201
DENNIS, B. N82-29238
DERBYSHIRE, F. J. N82-28472
DERECHO, A. T. N82-28487
N82-28488
DESISTO, T. S. N82-28412
DEUTSCH, R. N82-29197
N82-29198
DEWEY, C. F. N82-28582
DEWITT, R. N. N82-28509
DICK, R. I. N82-28854
DICKINSON, R. E. N82-28924
DICKMAN, D. M. N82-28496
DIDENKO, I. Y. N82-28970
DIMARIA, D. J. N82-29201
DIXON, J. D. N82-28484
DIXON, R. S. N82-28837
DOBMEIER, J. N82-29045
DODSON, H. W. N82-29255
DOLE, S. H. N82-28840
DOLPHIN, A. N82-28410
DONG, D. W. N82-29201
DONNELLY, R. G. N82-28458
DORE, M. J. N82-28856
DORSEY, W. F. N82-29173
DOUBLEDAY, C. F. N82-28539
DOUGHERTY, H. T. N82-28538
DOUMA, M. N82-28631
DOWDY, M. N82-29235
DOWNEY, S. W. N82-29178
DRAFALL, L. N82-28623
DRAKE, J. R. N82-29172
DRAPEAU, D. F. N82-28641
DREKSLER, H. L. N82-28294
DRENICK, R. F. N82-29104
DRIOLI, E. N82-28450
DRIVER, J. M. N82-28737
DROUILHET, S. N82-28585
DUBI, A. N82-29072
DUBININ, E. M. N82-29249
N82-29250
DUDEK, C. L. N82-29239
N82-29240
DUDEWICZ, E. J. N82-29098
DUDZIAK, D. J. N82-29072
DUETSCH, H. U. N82-28858
DUFFY, J. M. N82-29060
DUGAN, J. P. N82-28939
DULIKRAVICH, D. S. N82-28253
DUMOULIN, L. N82-29211
DUNHAM, J. B. N82-29033
DUNN, G. L. N82-28284
DURDEN, G. L. N82-28496
DURELLI, A. J. N82-28679
DUSTIN, M. O. N82-28786
DUVALL, L. N82-29045
DUZICH, J. J. N82-28294
DYE, R. H. N82-28728

E

EAST, J. R. N82-28554
EASTERLING, K. E. N82-28653
ECKSTROM, C. V. N82-28280
EDENBURN, M. W. N82-28812
EDRIS, E. V., JR. N82-28481
EFIMOV, G. V. N82-29214
EGGING, D. E. N82-28678
EHLERT, D. N82-28872
EIDELMAN, S. N82-28508
EINWICH, A. M. N82-28938
EITLHUBER, E. N82-29237
EITZEN, D. G. N82-29114
EKLUND, F. N82-28613
ELBER, W. N82-28279
ELDER, A. S. N82-29108
ELDRIDGE, G. W. N82-29202
ELLIOTT, H. N82-29162
ELSBERRY, R. L. N82-28911
ELSENAAR, A. N82-28262
EMBURY, J. F. N82-29163
EMERY, A. F. N82-28681
ENGDAHL, G. N82-29088
ENGEL, M. A. N82-28409
ENGEN, I. A. N82-28800
ENGLE, J. N82-28714
ENNS, J. B. N82-28670
ENSLOW, P. H., JR. N82-29018
EPHRATH, L. M. N82-29201
EPSTEIN, H. M. N82-28627
ERCKMANN, V. N82-29196
ETTERS, R. D. N82-28350
EVANS, D. L. N82-28799
N82-28803

F

FAIRCHILD, R. C. N82-28292
FAIRLIE, B. D. N82-28310
FALCONY, C. N82-29201
FALLON, P. T. N82-28469
FANTEL, R. J. N82-28769
FARRELL, C. A. N82-28247
FASCHING, W. A. N82-28297
FATEMI, M. N82-28656
FAULKNER, H. B. N82-28281
FAZIO, G. N82-29243
FENG, C. C. N82-28678
FENNELL, J. F. N82-28867
FEWKES, R. H. N82-28768
FIENUP, J. R. N82-29160
FILLIUS, W. N82-28312
FINDLAY, J. T. N82-28313
FINK, M. N82-29180
FINLEY, S. J. N82-28680
FINN, J. M. N82-29179
FINSON, M. L. N82-28588
FINTEL, M. N82-28488
FIROR, K. N82-28814
FISHER, J. F. N82-28400
FISHER, R. H. N82-29123
FITZSIMMONS, T. C. N82-29157
FLEIG, A. J. N82-28880
FLETCHER, E. R. N82-28990
FLETCHER, T. L. N82-28655
FLYTZANI-STEPHANOPOULOS, M. N82-28787
FORD, B. J. N82-29046
FORD, W. F. N82-29075
FORSDICK, H. C. N82-29067
N82-29068

FOWLER, G. S. N82-29007
FOWLER, T. K. N82-29185
FOY, E. N82-28576
FOYT, A. G. N82-28548
FRANCIS, P. E. N82-28410
FRERICKS, D. E. N82-28308
FREY, D. N82-28923
N82-28929
FRIEDRICH, R. N82-28838
FRISCH, G. D. N82-28989
FROELICH, R. K. N82-28554
FROST, W. N82-28881
FRY, J. E., JR. N82-29036
FRYKLUND, D. H. N82-28347
FUCHS, A. N82-29056
FUJIMURA, K. N82-29086
FUJIMURA, T. N82-29065
FULLER, E. R. N82-29114
FULTON, R. W. N82-29167

G

GABLER, E. C. N82-28475
GABRIEL, K. R. N82-28907
N82-29051
GALLE, R. R. N82-28961
GANGAL, M. D. N82-28790
GANGYI, Y. N82-28560
GARCIA, T. A. N82-28946
GARG, R. N82-29069
GARNIER, J. Y. N82-28484
GARRETT, H. N82-28550
GASANOV, Y. K. N82-28957
GASS, W. R. N82-28480
GAVER, D. P. N82-29102
GAVRILOVA, L. N. N82-28961
GAYDOS, L. N82-28709
GAYNOR, E. S. N82-28631
GAZENKO, O. G. N82-28949
GEBALLE, T. R. N82-29247
GEE, G. W. N82-29138
GEE, W. N82-28503
GEISLING, K. L. N82-28852
GELBWACHS, J. A. N82-28632
GELDERLOOS, H. J. C. N82-29013
GENIATULIN, K. V. N82-28978
GENT, A. N. N82-28452
N82-28453
N82-28677
GEORGE, A. N82-29084
GEORGE, J. A. N82-28758
GEORGE, T. F. N82-28633
GERGEN, J. N82-28720
GERLACH, J. C. N82-28606
GERTSEN, G. P. N82-28968
GESLEY, M. A. N82-29203
GHIRARDI, A. N82-28801
GHOLSON, N. H. N82-28343
GHOSH, S. K. N82-28488
GIARRATANO, P. J. N82-28574
GIBB, J. P. N82-28779
GIGUERE, R. P. N82-28324
GILLE, W. H., JR. N82-29232
GILLHAM, J. K. N82-28670
GILLIAM, T. M. N82-28428
GIRAMONTI, A. J. N82-28822
GLASER, P. E. N82-29004
GLOSS-SLOER, S. A. N82-29045
GOLCHERT, H. J. N82-28857
GOLDBERG, J. H. N82-28266
GOLDMAN, A. M. N82-29215
GOLDMAN, L. J. N82-28250
N82-28605
GOLDSTEIN, D. N82-28576
GOLOVKINA, O. L. N82-28958
N82-28959
GOLUB, G. H. N82-28758
GOLUBEVA, T. I. N82-28973
GONDHALEKAR, P. M. N82-29242
GONSALVES, R. N82-29161
GOODYER, M. J. N82-28304
GOOREVICH, C. E. N82-29024
N82-29029
N82-29030
N82-29036
GORDON, D. N82-28880
GORMAN, F. J. N82-28860
GORNEY, D. J. N82-28867
GORTON, R. L. N82-28821
GOTZ, G. N82-28909
GOULD, J. M. N82-28550
GOYETTE, P. J. N82-29055
GOZULOV, S. A. N82-28950
GRANA, D. N82-28604
GRANATH, B. N82-28613
GRANT, K. E. N82-28851
GRAY, H. L. N82-29100
GRAY, O. E. N82-28549
GRAY, T. H. N82-28302
N82-28305
N82-28306
GREBOWSKY, G. J. N82-28730
GREEN, A. L. N82-29034
GREENLAW, D. K. N82-29158
GREENWOOD, J. R. N82-29060
GREESON, P. E. N82-28688
GREGG, D. W. N82-28468
GRITTON, E. C. N82-28782
GRITZO, L. F. N82-28390
GROEGER, W. J. N82-28743
GROENWALD, R. A. N82-28650
GROSBECK, K. N82-28518
GROSSE, W. H. N82-29010
GROTEN, E. N82-28875
GRUBER, P. N82-28366
GRUN, J. N82-29180
GRUNWALD, G. K. N82-28771
GUARNIERI, C. R. N82-29201
GUBANOV, N. I. N82-28983
GUENTHER, R. A. N82-28572
GULDEN, M. E. N82-28418
GUNSHOL, L. P. N82-29056
GUOSONG, H. N82-29169
GUPTA, S. N82-28489
GUPTA, Y. P. N82-28810
GUSAKOVA, G. A. N82-28961
GUSTAFSON, A. J. N82-28261
GUTEK, B. A. N82-29224

H

HADDAD, G. I. N82-28554
HAEGERSTROEM, G. N82-29172
HAGGERTY, J. S. N82-28628
HAGIN, W. V. N82-28305
N82-28306
HAIN, G. N82-29049
HAIN, K. N82-29049
HALE, G. M. N82-28430
HALL, F. N82-28731
HALPERN, E. T. I. R. N82-29016
HAMILTON, H. H., II N82-28575
HAMILTON, M. F. N82-28587
HAMMOND, J. P. N82-28401
HAMRE, J. A. N82-28268
HANCOCK, K. L. N82-28377
HANKINS, D. E. N82-28284
HANNON, J. P. N82-28945
HANOUVA, M. N. H. N82-28282
HANSEN, C. H. N82-29121
N82-29122
HANSEN, F. R. N82-29162
HANSEN, J. P. N82-28520
HANSER, F. A. N82-28348
HARALICK, R. M. N82-28724
HARDIE, R. W. N82-29058
HARE, C. T. N82-28654
HAREL, M. N82-28865
HARMESON, R. H. N82-28770
HARR, P. A. N82-28888
N82-28932
N82-28933
HARRIS, M. A. N82-28555
HARRIS, P. N82-28343
HARTNAGEL, H. L. N82-29206
HARVEY, W. D. N82-28248
HASHIN, Z. N82-28359
HASIT, Y. N82-28654
HAUCK, H. N82-28872
HAUGHTON, L. F. N82-28948
HAWORTH, L. A. N82-28289
HAYES-ROTH, B. N82-29219
HAYES-ROTH, F. N82-29219
HAYN, D. N82-29153
HEARON, B. F. N82-28267
HEATH, M. T. N82-28758
N82-29084
HEATH, T. M. N82-28511
HEBB, R. C. N82-28309
HECK, M. L. N82-28313
HECKERT, C. M. N82-28364
N82-28365
HEDEMAN, E. R. N82-29255
HEFFRON, J. F. N82-28461
HEINEMANN, H. N82-28392
HEITMEYER, C. L. N82-29048
HELGESSON, H. G. N82-28613
HELMS, C. R. N82-28615
HENDERSON, J. C. N82-28289
HENDRICKS, R. C. N82-28574
HENNEKE, E. G. N82-28657
HENNESSY, R. T. N82-28999
HEPLER, A. K. N82-28664
HERBST, M. J. N82-29180
HERMES, R. E. N82-28388
N82-28390
N82-28391
HEROLD, H. N82-29197
HESS, M. R. N82-28942
HESS, R. W. N82-28782
HEUBERGER, H. S. N82-28718
HIBLER, W. D., III N82-28740
HIEBER, C. A. N82-28490
HIEFTJE, G. M. N82-29178
HIGGINS, A. N82-28510
HILDER, D. S. N82-28580
HILL, C. K. N82-28317
HINSHAW, J. C. N82-28446
HIRANO, K. N82-29175
HIRSCH, K. N82-29199
HIVELY, L. M. N82-29184
HOBGOOD, H. M. N82-29202
HOBSON, M. J. N82-28822
N82-28823
HOCKENBERGER, R. L. N82-28305
N82-28306
HOFFERT, M. N82-28917
HOGAN, S. N82-28814
HOGE, F. E. N82-28690
HOGLE, L. N82-28275
HOLIAN, B. L. N82-29132
HOLLAND, G. J. N82-28878
HOLLEY, A. E. N82-28522
HOLLMANN, B. Z. N82-28521
HOLMES, J. A. N82-29184
HOLMES, M. N82-28784
HOLMSTEDT, G. N82-28485
HOMSY, R. V. N82-28826
HON-YIM, K. N82-28678
HOOPER, C. N82-28551
HOPF, F. A. N82-29166
HOPKINSON, H. H. N82-28482
HOPPER, J. H. N82-29002
HORIIKE, H. N82-29192
HORIKAMI, K. N82-29065
HORNSTRA, F. N82-28569
HORSTMAN, D. H. N82-28993
HORTON, J. R. N82-28401
HOSINSKY, G. N82-29258
HOULBERG, W. A. N82-29184
HOWE, H. C. N82-29184
HOWELL, A. H. N82-28259
HOWERTON, R. J. N82-29139
HOWISON, W. W. N82-28243
HSU, N. N. N82-29114
HUANG, H. M. N82-28473
HUANG, M. Y. N82-28523
HUBER, E. N82-29206
HUBER, P. W. N82-28582
HUISMAN, H. N. N82-28686
HUISMAN, W. C. N82-28767
HUIZING, G. H. N82-28263
HULSTROM, R. L. N82-28825
HUMBLET, P. N82-28512
HUMPHREY, W. B. N82-29221
HUMPHREYS, E. A. N82-28359
HUSSAIN, E. C. N82-29231
HUSTON, R. L. N82-28646
HWANG, D. P. N82-28249
HYMAN, E. N82-29181
HYMAN, J. M. N82-29059

I

IDE, J. P. N82-28498
IGENBERGS, E. N82-29194
INGS, D. M. N82-29010

IQBAL, M. N82-28488
IRVINE, A. R. N82-28400
ISRAELEVICH, P. L. N82-29249
N82-29250
ISUPOV, V. G. N82-28960
ITAGAKI, K. N82-29204
ITO, T. I. N82-28353
IVANOV, V. N82-28979
IZZO, R. N82-29187

J

JACKSON, C. R. N82-28556
JACOBI, N. N82-29112
JACOBS, P. A. N82-29102
JACQ, J. N82-28602
JAEGER, U. N82-29197
N82-29198
JAGER, J. N82-28924
JAIN, A. N82-28502
JAMES, S. D. N82-28378
JANZEN, K. H. N82-28802
JAQUETTE, D. L. N82-28840
JENDEN, C. M. N82-28617
JENNE, R. L. N82-28925
JENSEN, A. P. N82-29018
JENSEN, E. D. N82-29069
JENSEN, K. N82-28623
JOHANNESSEN, O. M. N82-28740
JOHNSON, K. H. N82-28373
JOHNSON, M. E. N82-29071
JOHNSON, P. J. N82-28845
JOHNSON, T. L. N82-29070
JOHNSTON, D. E. N82-28300
JONES, D. E. N82-29251
JONES, D. I. G. N82-28661
JONES, R. M. N82-28542
N82-28543
JONES, T. A. N82-28651
JONSSON, S. N82-28613
JORDAN, C. N82-29242
JUDAY, R. D. N82-28725
N82-28731
JUHASZ, A. A. N82-28465

K

KALASINSKY, V. F. N82-28626
KALISKI, M. E. N82-29070
KALITA, N. F. N82-28952
KALTER, R. J. N82-28475
KAMEARI, A. N82-29193
KAMENSKIY, Y. N. N82-28976
KANE, E. N82-29177
KAPUSCIK, E. N82-29110
KARCHER, B. A. N82-29210
KAREL, M. N82-29003
N82-29006
KAROL, P. J. N82-28402
KARPOV, A. N. N82-28955
KARTY, J. L. N82-28865
KASTE, R. P. N82-28287
KASTEN, F. N82-28857
KATZ, J. N82-28618
KATZ, M. G. N82-28444
KAUAHIKAUA, J. N82-28869
KAUFMAN, H. R. N82-28350
KAVAYA, M. J. N82-28619
KAYSER, L. D. N82-28258
KEDZION, C. T. N82-28650
KELLERMEIER, H. N82-28322
KELLIHER, R. N82-28348
KELLY, G. M. N82-28313
KELLY, J. M. N82-28662
KENDALL, E. G. N82-28360
KENDALL, J. M., JR. N82-28442
KENNEDY, R. S. N82-28988
KERELIUK, S. N82-28285
KERNS, R. N82-28566
KERRISK, J. F. N82-29057
KEVAN, L. N82-28455
KHAYKIN, A. B. N82-28561
KHOMYAKOV, N. M. N82-28561
KIBBLER, A. E. N82-28398
KILROY, W. P. N82-28378
KIM, D. G. N82-28291
KIMMEL, K. N82-29001
KIMURA, M. N82-28663
KINDBERG, G. N82-29172
KING, A. P. N82-28495
KIRCHSCHLAGER, E. N82-28853
KIRKER, G. W. N82-28425
KIRKWOOD, B. J. N82-28798
KIRKWOOD, T. F. N82-28693
N82-28694
KLEIN, M. M. N82-29059
KLEMENT, D. N82-28535
KLENK, K. F. N82-28980
KLINKER, F. N82-28276
KLINZING, G. E. N82-28759
KLOSTER, K. N82-28775
KLOSTERMAN, E. L. N82-28636
KLYNNING, L. N82-29258
KLYUCHANSKAYA, N. V. N82-28972
KMETYK, L. N. N82-28819
KMIEC, R. J. N82-28569
KNIPSCHILD, K. E. N82-28399
KNUTH, D. E. N82-29044
KNYAZKOV, B. N. N82-29165
KOCH, R. A. N82-28931
KOELLE, D. E. N82-28322
KOENIG, J. L. N82-28454
KOFSKY, I. L. N82-28886
KOH, J. L. N82-28784
KOHRI, W. J. N82-28921
KOHSIEK, W. N82-28637
KOLFSCHOTEN, A. W. N82-29200
KOLKMAN, H. J. N82-28434
KOLKMANN, H. J. N82-28432
KONDOH, U. N82-29192
KORNELSEN, E. V. N82-28370
N82-28371
KORNIYENKO, V. N. N82-28957
KOTAS, J. F. N82-28803
KOTOVSKAYA, A. R. N82-28958
N82-28961
N82-28971
KOVALA, P. N82-28944
KOWALSKI, S. N82-28274
KOZIN, F. N82-29104
KRABILL, W. B. N82-28690
KRAFFT, G. A. N82-29186
KRAFT, G. N82-28795
KRAMER, E. J. N82-29208
KRASE, W. H. N82-28840
KRATZER, R. H. N82-28353
KRIKORIAN, O. H. N82-28804
KRISHNAIAH, P. R. N82-29077
KRUPINA, T. N. N82-28958
KRYSTINIK, K. B. N82-29099
KUBARYCH, K. G. N82-28418
KUETTNER, J. N82-28923
N82-28929
KUGLER, B. A. N82-29121
N82-29122
KUKULKA, J. Z. N82-28499
KULA, E. B. N82-28412
KUMAR, K. N82-28273
N82-28649
KUMINECZ, J. F. N82-28640
KUNG, C. Y. N82-28421
KUNZ, A. B. N82-29205
KUO, Y. S. N82-28642
KUOKKALA, V. T. N82-28443
KURKINA, L. M. N82-28967
KUROPATKIN, P. V. N82-28561
KUZMENKO, G. N. N82-28973
KUZNETSOV, N. A. N82-28561
KWAN, A. N82-28499
KWAN, A. J. N82-28268
KWETNIANSKI, R. N82-28966

L

LAAN, J. N. N82-29119
N82-29120
LAAUBODER, C. N82-28303
LACKNER, A. M. N82-29207
LADD, R. B. N82-29221
LADOUCEUR, H. D. N82-28387
LAFLAMME, A. N82-28559
LAGERSTROEM, E. N82-29172
LAI, S. K. N82-29201
LAN, B. N82-28466
LANDECKER, P. B. N82-29257
LANDY, F. J. N82-28997
LANGLAND, R. T. N82-28871
LATOUCHE, G. N82-29102
LATSKEVICH, A. A. N82-28953
LAU, N. C. N82-28925
LAUGHLIN, L. S. N82-28379
LAUKS, I. N82-28375
LAUSTEN, M. F. N82-28640
LAVIN, M. L. N82-28790
LAW, J. F. N82-29081
LAWRENCE, V. S. N82-28529
LAWSON, D. D. N82-28368
LECCECE, A. N82-28533
LECHOWICZ-KWIECIEN, K. N82-28910
LECLAIRE, R. N82-29188
LEE, A. Y. N82-28437
LEE, D. A. N82-28399
LEE, D. O. N82-28820
LEE, J. C. N82-28515
LEE, R. A. N82-28841
LEE, S. C. N82-28251
LEE, S. W. N82-28503
LEFFERTS, E. N82-29056
LEGER, G. S. N82-28672
LEHTO, M. L. N82-29010
LEIGH, R. N82-28833
LEINWEBER, D. N82-29020
LEISERSON, C. E. N82-29015
LEJENAES, H. N82-28918
LELGEMANN, D. N82-28872
LELL, P. N82-29252
N82-29253
LENNMALM, B. N82-28485
LEONG, P. J. N82-28284
LESICK, A. A. N82-29081
LESLIE, D. H. N82-28631
LESSARD, M. N82-28559
LESSARD, R. D. N82-28822
LEVASHOV, M. M. N82-28962
LEVER, A. B. P. N82-28381
LEVINE, H. N82-29074
LEVISON, W. H. N82-28298
LEWIS, J. G. N82-29078
LICOCCIA, S. N82-28381
LIETKE, G. H. N82-29103
LILLEY, B. F. N82-28295
LIN, C. C. N82-29130
LIN, D. L. N82-28868
LIN, J. T. N82-28633
LIN, J. W. N82-29158
LIN, K. H. N82-28400
LINDGREN, B. N82-29258
LINES, C. W., JR. N82-28290
LINTERN, G. N82-28988
N82-28999
LIPEROVSKY, V. A. N82-28855
LITSOV, A. N. N82-28951
LIVINGSTON, H. D. N82-28942
LLYKHIN, A. V. N82-28972
LO, J. T. N82-29107
LOCKWOOD, J. N82-28795
LONG, A. C. N82-29033
LOPER, G. L. ..... N82-2[illegible]
LORENTZ, M. ..... N[illegible]
LORSCH, H. G. N82-28797
LOVEDAY, M. S. N82-28668
LOZINSKIY, P. A. N82-28953
LUCARINI, L. N82-28791
LUCICH, G. M. N82-28614
LUHMANN, J. G. N82-29244
LUM, Y. F. N82-28499
LUND, J. W. N82-28477
LURIA, S. M. N82-29008
LYBANON, M. N82-28935
LYNCH, N. A. N82-29018
LYNN, F. R. N82-28465
LYON, J. F. N82-29184
LYTLE, C. D. N82-28278

M

MA, L. N. N82-28523
MABEL, J. A. N82-29004
MABUCHI, M. N82-28663
MACGREGOR, W. I. N82-29067
N82-29068
MACKENZIE, F. D. N82-28278
MADDEN, R. A. N82-28918
MAINS, R. K. N82-28554
MAKAR, H. V. N82-28435
N82-28436

MAKSIMOV, D. G. N82-28960
MALIK, M. R. N82-28573
MALKUS, W. V. R. N82-28590
MALLOZZI, P. J. N82-28627
MANCINI, A. N82-28863
MANHEIMER, W. M. N82-29179
MANKIN, D. A. N82-29224
MANNING, J. R. N82-28411
MANOS, D. N82-28426
MANSFIELD, P. J. N82-28904
MANZO, G. N82-28558
MARENNYY, A. M. N82-28968
MARGALIT, S. N82-28618
MARGERUM, J. D. N82-29207
MARK, J. W. K. N82-29186
MARKER, R. L. N82-28260
MARKIN, A. S. N82-28971
MARKIN, K. N82-28275
MAROCHNIK, L. S. N82-29254
MARS, L. N82-28459
MARTENY, P. N82-28453
N82-28677
MARTIN, C. F. N82-28690
MARTIN, D. P. N82-28501
MARTIN, P. N82-28523
MARTIN, R. L. N82-28296
MARTIN, S. N82-28740
MARTINELLI, G. N82-29066
MARTIRE, D. E. N82-28408
MARTONE, J. A. N82-28994
MARTYN, D. N82-28908
MARUSAK, T. J. N82-28648
MASHER, D. P. N82-28547
MASON, G. F. N82-29167
MATARE, J. N82-28536
N82-28537
MATHENEY, J. L. N82-28550
MATHER, K. N82-29235
MATHESON, R. J. N82-28529
MATHIESON, T. A. N82-28650
MATHUR, M. P. N82-28759
MATLACK, G. M. N82-28848
MATSUURA, T. N82-29191
MAURER, R. E. N82-28647
MAX, S. R. N82-28986
MAY, I. W. N82-28465
MAYER, D. W. N82-29138
MAYO, F. R. N82-28466
MAYO, H. A., JR. N82-28834
MCAULAY, R. J. N62-28513
MCCAMBRIDGE, J. J. N82-29222
MCCARTHY, R. N82-28363
MCCARVER, J. F. N82-28422
MCCLELLAN, M. N82-29027
MCCOMB, H. G., JR. N82-28346
MCCORMACK, R. N82-28517
MCDERMID, J. A. N82-29019
MCDONALD, H. N82-28584
N82-28589
MCDONALD, J. K. N82-28626
MCFARLAND, W. D. N82-28768
MCGARRY, F. E. N82-29024
N82-29028
N82-29034
N82-29036
MCGLONE, J. C. N82-28739
MCGOWAN, L. A. N82-28267
MCGREW, D. N82-28913
N82-28914
N82-28915
N82-28916
MCKEAN, J. W. N82-29095
MCKENZIE, D. L. N82-29257
MCKOWN, H. S. N82-28611
MCLAUGHLIN, A. J. N82-28563
MCLAUGHLIN, J. F. N82-29212
MCLAUGHLIN, S. B. N82-28844
MCLEAN, E. A. N82-28639
MCLLWAIN, J. F. N82-28493
MCNEESE, L. E. N82-28824
MCNEILL, B. W. N82-28802
N82-28803
MCNEILLY, C. N82-28518
MCRAE, J. A. N82-28885
MCRUER, D. N82-28300
MCWHORTER, A. L. N82-28563
N82-29209
MEADOWS, A. J. N82-29242
MEETER, E. N82-28996
MEHDI, I. S. N82-28284
MEIBAUM, R. A. N82-28752
MEIER, G. E. A. N82-28599
MEISTRING, R. N82-28457
MELLOR, F. K. N82-28590
MENDILLO, M. N82-28866
MENDOZA-ZELIS, L. N82-29211
MEOT, F. N82-29136
MERRICK, D. N82-28822
MERRITT, J. A. N82-28626
MERWARTH, P. D. N82-29027
N82-29034
MESHKOVA, N. N. N82-28981
METIU, H. N82-28384
N82-28385
MEYER, C. N82-28602
MEYERS, L. V. N82-28461
MGANA, C. V. M. N82-29111
MICHEL, R. N82-28698
MIETRACH, D. N82-28486
MIKHAIL, E. M. N82-28726
N82-28739
MILLER, C. W. N82-29226
MILLER, M. M. N82-28408
MILLER, W. N. N82-28549
MILLIKEN, J. A. N82-28378
MILLS, C. F. N82-29071
MINCHENER, A. J. N82-28427
MINGYOU, H. N82-29093
MIROSHNIKOV, A. N82-28979
MITCHELL, R. N82-28386
MITTRA, R. N82-28503
N82-28517
MIYATA, T. N82-28663
MIZERA, P. F. N82-28867
MOHLER, S. R. N82-29012
MOIN, P. N82-28577
MOKROUSOVA, A. V. N82-28971
MONTMINY, B. N82-28559
MOONAN, W. J. N82-28996
MOONEY, K. A. N82-28930
MOORE, D. N82-28807
MOORE, R. N82-28426
MOORES, W. Y. N82-28945
MOOSE, R. A. N82-28859
MOOZ, W. E. N82-28840
MORAVEC, T. J. N82-29158
MORE, R. M. N82-29124
MOREL, P. R. N82-28348
MORETTI, G. N82-28246
MORGAN, T. O. N82-28947
MORGANS, L. F. N82-28991
MORITA, H. N82-29192
MORRIS, W. D. N82-28939
MORRIS, W. F. N82-28796
MORRISON, P. F. N82-28840
MOSBURG, E. R., JR. N82-28566
MOSELY, J. N82-28512
MOZER, A. N82-29197
MUELLER, G. N82-29196
MUENZEL, W. D. N82-28597
MULEY, S. R. N82-28759
MUNNIKSMA, B. N82-28262
MURPHY, B. L. N82-29137
MURPHY, L. M. N82-28805
MUSGA, M. J. N82-28552
MYERS, J. D. N82-28621
MYERS, J. O. N82-28496
MYERS, T. T. N82-28300

N

NADEAU, D. N82-29247
NADERI, F. N82-28325
N82-28330
NAGARKAR, A. P. N82-28356
NAGLE-ESHLEMAN, J. N82-28476
N82-28673
NAGLE-ESHLEMEN, J. N82-28659
NAKACH, A. N82-29133
NAKAHARA, Y. N82-29065
NAMSRAI, K. N82-29214
NANDA, A. K. N82-28394
NANDY, K. N82-29242
NASYROVA, A. M. N82-28975
NEDERVEEN, A. N82-28433
NEILY, C. M., JR. N82-28501
NEISWANDER, P. A. N82-28818
NELSON, B. E. N82-28988
NELSON, R. W. N82-29138
NEUHOFF, F. N82-28608
NEUMEIER, L. A. N82-28493
NEWHOUSE, H. L. N82-28792
NG, E. N82-29084
NICHOLS, B. A. N82-28388
NICHOLS, D. A. N82-28712
NICHOLS, M. C. N82-29062
NICOLAIS, L. N82-28450
NIELSEN, R. N82-28913
N82-28914
N82-28915
N82-28916
NIGHAN, W. L. N82-28634
NILSON, R. H. N82-28870
NILSSON, B. N82-28613
NINOMIYA, H. N82-29193
NINOS, N. J. N82-28647
NISHIMOTO, C. N82-28551
NIXON, R. D. N82-29010
NOBACK, R. N82-28303
NOBLE, J. N82-29236
NORTHCUTT, J. D. N82-29069
NOWICKI, W. I. N82-29060
NOZIK, A. J. N82-28813
NUERNBERG, H. W. N82-28667

O

OBERMEIER, F. N82-29118
OBRIEN, C. D. N82-28499
OBRIEN, W. E. N82-28846
ODOERFER, G. A. N82-28472
ODOROFF, C. L. N82-29051
OFNER, E. N82-28612
OGALLAGHER, J. J. N82-28568
N82-28830
OGI, S. K. N82-28523
OHARA, F. M., JR. N82-28400
OHEARN, M. N82-28779
OHNISHI, M. N82-29175
OKAMOTO, M. N82-29175
OLSON, G. B. N82-28412
OLSON, K. A. N82-28511
OLSSON, W. J. N82-28296
ONG, Y. N82-29036
ORLANDI, G. N82-29066
N82-29087
ORLOV, L. L. N82-28952
OSBORNE, S. R. N82-28305
N82-28306
OSTER, C. A. N82-29138
OTAWA, T. N82-28831
OTSUKA, A. N82-28663
OWENS, D. J. N82-29055
OWSLEY, N. L. N82-29081
OYEN, L. C. N82-29148

P

PACIOREK, K. J. L. N82-28353
PAEAEKKOENEN, E. J. N82-28443
PAFFRATH, D. N82-28853
PAINTER, J. F. N82-28594
PAJERSKI, R. S. N82-29024
N82-29030
N82-29034
N82-29036
PALMADESSO, P. J. N82-29181
PARGETER, J. K. N82-28436
PARIDON, C. A. N82-28643
PARK, W. J. N82-28357
PARKS, V. J. N82-28607
PARMELEE, R. A. N82-28487
PARNAS, D. L. N82-29048
PARRISH, W. H. N82-28804
PARSONS, C. L. N82-28606
PASS, J. J. N82-29097
PATTAVINA, A. N82-28533
N82-28534
PATTERSON, A. K. N82-28906
PATTERSON, J. H. N82-28848
PAUL, B. P. N82-28256
PAULSON, D. L. N82-28437
PAVLOVA, N. N. N82-28970
PAYNE, D. R. N82-29010
PAYNE, P. R. N82-28792
PEACE, A. J. N62-28254
PEAK, J. E. N82-28911

PEDERSEN, J. C. N82-28507
PEDERSEN, N. E. N82-28507
PEDERSON, J. R. N82-28776
PEEBLES, S. W. N82-28346
PEELE, W. D. N82-29259
PEI, R. Y. N82-28697
N82-28782
PELLERIN, R. A. N82-28475
PENG, Y. K. M. N82-29184
PENNY, M. F. N82-28741
PENROD, D. D. N82-28658
PENSTON, M. V. N82-29242
PENZIEN, J. N82-28489
PERRY, B., III N82-28299
PERRYMAN, D. C. N82-28286
PESAVENTO, F. L. N82-29201
PETER, K. N82-28274
PETERS, D. J. N82-29260
PETERSEN, G. R. N82-28368
PETERSON, D. F. N82-28554
PETERSON, G. N82-29053
PETERSON, G. R. N82-28438
N82-28769
PETERSON, L. M. N82-28383
PETRI, F. N82-28273
PETRUSCHELL, R. L. N82-28692
PETTINI, M. N82-29242
PFEIFFER, P. N82-28558
PHAM, T. C. N82-28933
PICKERING, H. W. N82-28420
PIERCE, G. A. N82-28282
PILKEY, W. D. N82-28301
PILLER, S. N82-29235
PIMENTEL, G. C. N82-28609
PINE, V. W. N82-28868
PINES, S. N82-28269
PINKERTON, J. R. N82-29050
PIPES, R. B. N82-28356
PITTS, J. N., JR. N82-28842
N82-28843
PIVIROTTO, T. J. N82-28616
PLECHATY, E. F. N82-29139
PLEMMONS, R. J. N82-28758
PLUMB, S. N82-29051
PODGORNY, I. M. N82-29249
N82-29250
POLLOCK, N. N82-28311
POLYAKOV, A. N. N82-28970
POLYAKOV, B. I. N82-28960
POLYAKOVA, A. P. N82-28954
POPE, S. B. N82-28374
POPOV, I. G. N82-28953
POSTAK, J. N. N82-29221
POSTLETHWAITE, M. A. J. N82-28668
POTAPOV, P. P. N82-28969
POTTER, M. W. N82-28396
POWERS, J. M. N82-28267
PRAKASH, A. N82-28713
PREGENT, G. N82-28795
PRIESTLEY, J. T. N82-28905
PRIMDAHL, I. S. N82-28873
PRUSIEWICZ, B. J. N82-29036
PTITSYNA, N. G. N82-28956
PULLES, J. W. N82-28692
PURNELL, J. G. N82-28593

R

RABITZ, H. N82-29129
RADDIN, J. H., JR. N82-28267
RADES, M. N82-28675
RADKIEWICZ, R. J. N82-28308
RAJAIAH, K. N82-28679
RALEIGH, M. N82-28592
RALEY, J. H. N82-28764
RAMAN, K. R. N82-28624
RAMASWAMY, B. S. N82-28381
RAMSDELL, J. V. N82-28936
RAPHAEL, L. A. N82-29079
RAPP, C. F. N82-28620
RASCH, N. O. N82-28293
RATERINK, H. J. N82-29115
RATH, B. B. N82-28656
RAY, S. N. N82-29056
RAYMOND, M. N82-28806
READY, J. F. N82-29158
REDDY, A. S. S. R. N82-28345
REED, S. A. N82-28821
REED, T. D. N82-28579
REES, D. N82-28629
REES, S. N82-28630
REGO, R. N82-28562
REICHEL, L. N82-29089
N82-29090
REIF, H. E. N82-28462
N82-28463
N82-28464
REIF, J. N82-29053
REIFSNIDER, K. L. N82-28657
REMIZOV, S. M. N82-28970
REPNAU, T. N82-28692
N82-28693
RICH, S. E. N82-28297
RICHARDS, F. A. N82-29260
RICHARDS, J. N82-28629
RICHARDS, S. H. N82-29239
N82-29240
RICHEY, A. N82-29235
RICHMOND, D. R. N82-28990
RICHTMYER, R. D. N82-28603
RICKARD, W. W. N82-28298
RIDGWAY, W. L. N82-28859
RIEDLER, W. N82-28612
RILEY, J. L. N82-28610
RILEY, W. C. N82-28360
RINEHART, R. J. N82-28552
RIPIN, B. H. N82-28639
RIPLEY, P. S. N82-28842
N82-28843
RIPPEL, D. A. N82-28255
RITCHIE, R. O. N82-28422
N82-28423
RITSCHARD, R. L. N82-28801
ROACH, J. W. N82-29007
ROBERTS, A. G. N82-28427
ROBERTS, P. A. N82-28696
ROBERTSHAW, G. A. N82-28342
ROBERTSON, J. B. N82-29145
ROBINSON, L. A. N82-28316
ROBINSON, R. S. N82-28350
ROEHKEL, K. N82-29206
ROEHR, H. N82-29199
ROELOF, E. C. N82-29255
ROFER-DEPOORTER, C. K. N82-28388
N82-28390
N82-28391
ROGERS, D. G. N82-28601
ROJEY, A. N82-28602
ROMANOVA, I. A. N82-28953
ROPERT, A. N82-29131
ROSE, W. C. N82-28624
ROSEBOOM, E. H., JR. N82-29145
ROSEN, B. W. N82-28356
ROSHKO, A. N82-28591
ROSS, C. N82-28562
ROSSER, R. W. N82-28353
ROTHMAN, A. J. N82-28764
ROTMAN, W. N82-28515
ROUSE, L. J., JR. N82-29164
ROUSSEAU, A. L. N82-28557
ROVERI, A. N82-28533
N82-28534
ROWAN, G. N82-28576
RUBENSON, D. S. N82-28697
RUDKO, M. N82-28505
RUDNEVA, S. V. N82-28965
RUDNICK, L. R. N82-28472
RUGGERI, R. T. N82-28448
RUIZ, R. N82-28804
RULE, T. T. N82-28799
RUPPE, H. O. N82-28352
N82-29153
N82-29248
RUSSELL, J. G. N82-28291
RUSSELL, R. W. N82-29247
RUSSELL, W. N82-28510
RUSSO, A. L. N82-28595
RUST, C. L. N82-29222
RUTHERFORD, P. H. N82-29184
RUTLEDGE, S. K. N82-28445
RUZIC, D. N82-28426
RYAN, D. A. P. N82-28397
RYAN, L. M. N82-28395
RYDERMAN, A. N82-28485

S

SAATCIOGLU, M. N82-28487
SADOWSKI, M. N82-29197
SAGALOWICZ, D. N82-29228
SALEM, S. L. N82-28840
SALERNO, M. N82-29066
SALTER, R. G. N82-28840
SALVATTI, F., JR. N82-28506
SALZMANN, H. N82-29199
SAMN, S. N82-29011
SAND, W. R. N82-28928
SANDBERG, P. I. N82-28684
SANDFORD, M. C. W. N82-29242
SANDHOLTZ, W. A. N82-28764
SANFORD, R. J. N82-28607
SANTNER, J. S. N82-28416
SASMAN, R. T. N82-28779
SASSCER, D. S. N82-28947
SAVAGE, M. N82-28643
N82-28645
SAVINA, Y. A. N82-28971
SAXE, J. B. N82-29015
SAYLOR, D. M. N82-28261
SCANLON, A. N82-28487
N82-28488
SCHAEFER, R. J. N82-28411
SCHANSMAN, R. R. N82-28545
SCHANTZ, R. E. N82-29067
N82-29068
SCHECHTER, R. N82-28904
SCHEFTER, J. L. N82-28783
SCHEPS, R. N82-28622
SCHICHT, R. J. N82-28779
SCHMIDT, G. N82-28652
SCHMIDT, H. N82-29197
SCHMIDT, M. J. N82-28868
SCHMIDT, R. N82-28612
SCHMIDT, R. A. N82-28680
SCHMIT, F. M. N82-29158
SCHMOLLA, W. N82-29206
SCHNEIDER, A. N82-28462
N82-28463
N82-28464
SCHNEIDER, R. N82-29145
SCHNEIDEWIND, N. F. N82-29047
SCHNELLE, F. N82-28876
SCHNETZER, S. R. N82-29141
SCHRA, L. N82-28432
N82-28434
N82-28686
SCHRADER, R. M. N82-29095
SCHRAMM, G. N82-29199
SCHROCK, R. R. N82-28405
SCHUCANY, W. R. N82-29100
SCHUELER, L. N82-29103
SCHULTZ, M. J., III N82-28511
SCHUST, A. N82-28274
SCHWARTZ, S. A. N82-28615
SCHWEDOCK, J. P. N82-28462
N82-28463
N82-28464
SCHWENK, J. C. N82-28244
SCHWERZEL, R. E. N82-28627
SCHWINGENSCHUH, K. N82-28612
SCHWOERER, K. N82-29196
SCLOVE, S. L. N82-29080
SCOTT, E. W. N82-28504
SEARCY, J. Q. N82-28818
SEASHOLTZ, R. G. N82-28250
N82-28605
SEDARD, J. L. N82-28494
SEIJI, N. N82-28663
SEITZ, C. A. N82-28614
SELCUK, M. K. N82-28785
SELLECK, C. B. N82-29064
SELLERS, B. N82-28348
SEPETOVA, N. G. N82-28965
SERRA, E. N82-28429
SHA, L. N82-29069
SHABAYEV, V. P. N82-28974
SHAFIRKIN, A. V. N82-28972
SHALIMOV, S. L. N82-28855
SHANNON, R. H. N82-29000
N82-29009
SHAPIRO, N. N82-29219
SHAPIRO, R. N82-28904
SHAW, P. T. P. N82-28943
SHEAR, R. C. N82-28680
SHELL, P. K. N82-28804
SHEN, S. F. N82-28490
SHENITZ, C. M. N82-29026
N82-29028

SHEPPARD, D. J. N82-28988
SHEPPARD, L. M. N82-28257
SHILLIDAY, T. S. N82-28655
SHINODA, P. N82-28252
SHINYA, K. N82-29193
SHIPOV, A. A. N82-28971
SHIRAH, R. H. N82-28413
SHKOLNIKOVA, S. N82-29249
SHOLKOVITZ, E. R. N82-28942
SHOOTER, J. A. N82-28931
SHORE, J. E. N82-29048
SHRINER, D. S. N82-28844
SHUBIN, V. S. N82-28957
SHUMEUCKER, S. S. L. N82-28361
SHUSTER, M. D. N82-29056
SIDI, A. N82-29075
SIEGEL, A. F. N82-29050
SILLS, T. N82-28833
SIMAKOV, A. B. N82-28982
SIMANDL, R. F. N82-29212
SIMMONS, J. A. N82-29114
SIMON N82-29154
SINCLAIR, S. R. M. N82-28285
SINGER, A. N82-28853
SINGETHAN, J. N82-29196
SINGH, J. J. N82-28839
SINGH, S. P. N. N82-28845
SINGH, V. P. N82-28772
SINORADZKI, H. M. N82-29189
SINTON, S. W. N82-29134
SIZHENG, C. N82-29169
SKOBERNE, F. N82-29189
SKURIDIN, G. A. N82-28855
SLAGLE, J. N82-29016
SLAMANIG, H. N82-28344
SLAVIK, R. J. N82-28786
SMARDZEWSKI, R. R. N82-28387
SMILEY, J. D. N82-28529
SMIRLE, J. C. N82-28499
SMIRNOV, V. A. N82-28961
SMITH, A. C. N82-28839
SMITH, C. G. N82-28842
N82-28843
SMITH, D. A. N82-29075
SMITH, D. H. N82-28611
SMITH, D. K. N82-29062
SMITH, E. J. N82-29034
SMITH, J. B. N82-28355
SMITH, J. P. N82-28305
N82-28306
SMITH, J. S. N82-28547
SMITH, M. F. N82-28424
SMITH, M. W. N82-28271
SMITH, O. E. N82-29094
SMITH, P. M. N82-28937
SMITH, S. M. N82-29155
SMUKLER, L. N82-28795
SNYDER, J. P. N82-28722
SNYDER, R. D. N82-28771
SOEDERLIND, G. N82-29091
SOEDERLING, G. N82-29092
SOICHER, H. N82-28860
SOLOMON, K. A. N82-29146
SOLOMON, S. N82-28874
SOLTIS, L. A. N82-28669
SOMERS, D. M. N82-28248
SONDEREGGER, R. C. N82-28484
SONI, A. N82-28479
SOREF, R. A. N82-29159
SOREM, R. K. N82-28768
SOVEY, J. S. N82-28440
SPAIN, C. V. N82-28280
SPENCE, H. N82-28866
SPENCER, J. R. N82-28419
SPICER, W. E. N82-28615
SPIRO, R. W. N82-28865
SPITZNAGEL, J. A. N82-29124
SPRANGLE, P. N82-28638
SPRINGER, G. S. N82-28358
SRINIVASAN, V. N82-28479
SRIVASTAVA, S. N82-29217
ST.JOHN, G. A. N82-28466
STACK, J. P. N82-28248
STALCUP, B. W. N82-28939
STAMPER, J. A. N82-28639
STAMPS, M. A. N82-28632
STANTON, N. R. N82-29140
STARK, M. E. N82-29034
STEARNS, S. D. N82-28532
STECKEL, G. L. N82-28360
STEIN, V. N82-28535
STEINBERG, M. N82-28469
STEINER, H. J. N82-28535
STEINHOFF, R. G. N82-29054
STEINVALL, O. N82-28613
STEPHENS, F. B. N82-28796
STEUER, K. H. N82-29199
STEVENS, P. R. N82-29145
STEVENSON, J. F. N82-28490
STIRN, R. J. N82-28780
STOKES, R. J. N82-29158
STOLTZMANN, D. N82-29158
STONE, W. R. N82-28862
STONEBURNER, J. D. N82-29112
STONESTROM, P. N82-28551
STOVALL, T. K. N82-28821
STRAND, R. C. N82-29170
STRAUB, G. K. N82-29132
STREET, R. A. N82-29213
STRICKLAND, D. J. N82-28868
STROUP, J. N82-29048
STULEN, F. B. N82-28655
STUPAKOV, G. P. N82-28970
SUCHENTRUNK, R. N82-28431
SUCIU, D. F. N82-28849
SULZER, R. L. N82-29012
SUMMY, A. D. N82-28930
SURESH, S. N82-28423
SUSHKOV, F. V. N82-28965
SUTTON, L. R. N82-28260
SUVOROV, A. V. N82-28964
SWAN, W. M. N82-28281
SWANN, D. N82-28274
SWANSON, L. W. N82-29203
SWANSON, R. E. N82-29132
SWEGLE, A. R. N82-28664
SWERNOFSKY, S. A. N82-29067
N82-29068
SWOBODA, C. A. N82-28569
SWOPE, G. R. N82-29081
SZEWCZYK, A. F. N82-28682

T

TAFT, B. A. N82-28944
TAKEDA, T. N82-29191
TAMARINA, N. A. N82-28980
TAMMARU, I. N82-28557
TANAKA, S. N82-29192
TANAKA, Y. N82-29191
TANG, C. M. N82-28638
TANG, J. H. N82-29144
TASAKI, K. K. N82-29024
N82-29026
N82-29028
N82-29036
N82-29056
TAYLOR, G. E. N82-28844
TAYLOR, G. R. N82-28283
TAYLOR, N. J. N82-28615
TAYLOR, W. A. N82-29034
TELES, J. N82-29029
N82-29030
TEWARI, Y. B. N82-28408
THART, W. G. J. N82-28432
N82-28433
N82-28434
THAYER, W. J., III N82-28636
THOMAS, G. H. N82-28681
THOMAS, J. L. N82-28926
THOMAS, P. R. N82-28438
THOMAS, R. H. N82-29067
N82-29068
THOMAS, R. N. N82-29202
THOMASSEN, K. I. N82-29185
THOMPSON, D. E. N82-28587
THOMPSON, J. D. N82-28936
THOMPSON, K. D. N82-28319
THORNE, M. E. N82-29216
THORNTON, E. A. N82-28666
THORSNESS, C. B. N82-28468
N82-28470
THRASHER, D. I. N82-28467
THROCKMORTON, D. A. N82-28575
THROOP, J. F. N82-28672
THUMM, M. N82-29196
TIEDERMAN, W. G. N82-28581
TIGRANYAN, R. A. N82-28952
N82-28966
N82-28967
TIPPMANN, H. N82-28431
TIPTON, W. J. N82-28752
TOBIAS, R. H. N82-28452
TOERMAELAE, P. N82-28443
TOKUDA, S. N82-29191
TONER, S. G. N82-29067
N82-29068
TONG, T. N82-28473
TOOP, J. N82-28986
TOPLOSKY, J. N82-28423
TORDA, T. N82-28966
TORSTENSSON, H. N82-28683
TOSTESON, T. R. N82-28947
TOTH, S. N82-28275
TOUART, C. N. N82-28904
TOWERS, T. A. N82-28496
TOWNSEND, D. P. N82-28645
TRAVERS, A. N82-29211
TRENT, B. C. N82-28871
TRIGILA, S. N82-28534
TRIPLETT, M. B. N82-29146
TRIPP, L. J. N82-28764
TRIYEDI, K. N82-29022
TROWBRIDGE, C. A. N82-28886
TRUKHANOV, K. A. N82-28956
TRUSTY, G. L. N82-28631
TSANG, R. W. N82-28406
TSAREGORODTSEV, G. I. N82-28983
TSIANCO, M. C. N82-28907
N82-29051
TSIPOURAS, P. N82-29076
TSURIKOVA, G. P. N82-28963
TUBBS, J. D. N82-29094
TUCKER, R. F., JR. N82-29148
TUMAKOV, A. I. N82-28962
TURNER, C. N82-29045
TURNER, R. E. N82-28317
TYCE, R. C. N82-29146
TYSSEDAL, J. N82-29101
TZONG, T. J. N82-28489

U

UHM, H. S. N82-29127
N82-29128
ULLMAN, T. L. N82-28654
ULRICH, H. G., III N82-28414
UNDERWOOD, J. H. N82-28672
UNGAR, S. G. N82-28715
UNNINAYAR, S. N82-28923
N82-28929

V

VALAVANOGLOU, N. N82-28612
VANADIT-ELLIS, W. N82-28481
VANDERBORGH, N. E. N82-28388
N82-28391
VANDERLINDEN, H. H. N82-28685
VANDERMEULEN, E. C. N82-29098
VANDERVOOREN, J. N82-28263
VANENGELEN, J. A. J. N82-28262
VANESSEN, A. N82-28263
VANGORKUM, A. A. N82-28369
N82-28370
N82-28371
VANZUYLEN, P. N82-29115
VARGHESE, P. N82-28472
VASILYEV, P. V. N82-28950
VEEN, M. A. N82-28692
VEMURI, V. N82-28314
VENERUSO, A. F. N82-28567
VERHEIJ, J. W. N82-29117
VERHULST, K. N82-29116
VERZINO, W. J., JR. N82-28388
N82-28390
N82-28391
VIDAL, J. N82-28602
VILLIERS-FISHER, J. F. N82-28845
VILVILYAMS, I. F. N82-28958
VISWANATHAN, V. R. N82-28510
VITING, T. A. N82-28952
VNUKOVA, Z. Y. N82-28965
VOECKS, G. E. N82-28787
VOLOZHIN, A. I. N82-28970

W

WADHAMS, P. N82-28740
WAGNER, F. T. N82-28393
WAKEFIELD, J. P. N82-28544
WALIGORA, S. R. N82-29024
N82-29030
N82-29036
WALKER, L. P. N82-28475
WALKER, R. L. N82-28611
WALKIEWICZ, J. W. N82-28439
WALLACE, D. C. N82-29132
WALLENIUS, K. T. N82-29096
WALSH, R. N82-28356
WALTON, J. R. N82-28611
WAN, C. A. N82-28492
WANG, K. K. N82-28490
WANG, T. N82-29112
WANG, T. S. F. N82-29186
WANN, T. C. N82-28903
WARBER, C. R. N82-28509
WARDELL, R. V. N82-28427
WARPINSKI, N. R. N82-28680
WARREN, R. E. N82-28509
WASHINGTON, W. M. N82-28924
WASIK, S. P. N82-28408
WATERMAN, P. C. N82-28507
WATSON, J. S. N82-28428
WAYMIRE, W. J. N82-28290
WEBB, J. P. N82-28541
WEBER, C. N82-29103
WEDEMEYER, E. N82-28256
WEDER, M. N82-28321
WEIGAND, A. J. N82-28440
WEIKLE, D. C. N82-28525
WEINACHT, P. N82-28586
WEISNER, W. N82-28913
N82-28914
N82-28915
WEISS, D. M. N82-29048
WELCH, R. N82-28721
WELDEN, T. N82-29027
WELLS, I. D. N82-28784
WELSH, J. P. N82-28933
WEN, C. Y. N82-28473
WENDORF, J. W. N82-29069
WENTZEL, H. P. N82-28364
WERKING, R. N82-29056
WESCOURT, K. N82-29219
WEST, R. N82-28451
WESTRA, D. P. N82-28988
WETTSTEIN, E. N82-28649
WHAM, R. M. N82-28845
WHANG, K. Y. N82-29228
WHELAN, J. A. J. N82-29242
WHITE, G. H. N82-28925
WHITE, P. N82-28793
WHITE, R. P., JR. N82-28260
WHITEHURST, D. D. N82-28472
WHITEHURST, M. N82-28606
WHITLOCK, R. R. N82-29180
WHITON, F. N82-28258
WICKERTS, S. N82-28919
WIEDERHOLD, G. N82-29228
WIESNER, W. N82-28916
WIKOFF, P. M. N82-28849
WILCOX, D. C. N82-28583
WILHELM, R. N82-29196
WILKINS, J. R. N82-28604
WILLIAMS, J. E. C. N82-29188
WILLIAMSON, R. C. N82-28548
WILLIS, A. E. N82-28550
WILLIS, A. J. N82-29242
WILLIS, J. B. N82-28311
WILSEN, P. J. N82-28630
WILSON, D. A. N82-28435
WILSON, R. N82-29242
WINEHOLT, E. M. N82-29108
WINOGRAD, N. N82-28376
WINSTON, J. S. N82-28439
WINSTON, R. N82-28568
N82-28830
WIPF, S. L. N82-29190
WISCOMBE, W. N82-28917
WITKOWSKI, R. E. N82-28480
WITTMEYER, J. F., III N82-28511
WOICK, B. N82-28838
WOLF, K. A. N82-28840
WOLF, R. A. N82-28865
WOLF, S. W. D. N82-28304
WOLFE, R. H., JR. N82-28725
WOLFF, H. N82-29103
WOLLAM, J. N82-28273
N82-28649
WOLSKI, R. N82-28924
WONG, E. L. N82-28460
WONG, M. M. N82-28439
WOOD, B. D. N82-28799
N82-28802
N82-28803
WOODEN, W. N82-29033
WORATSCHEK, R. N82-28289
WYDEVEN, T. J. N82-28444

X

XIANWANG, L. N82-29147
XUETONG, L. N82-28351

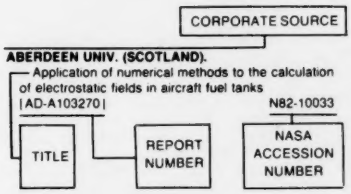
Y

YANG, D. N82-28554
YANG, T. N82-29188
YANOVSKIY, M. S. N82-29165
YAO, N. P. N82-28569
YARIV, A. N82-28618
YARULLIN, K. K. N82-28958
YEGOROV, A. D. N82-28954
YEH, Y. C. M. N82-28780
YELVERTON, J. T. N82-28990
YODER, G. R. N82-28417
YODER, R. C. N82-29168
YOUNG, D. R. N82-29201
YOUNG, G. N82-29005
YOUNG, K. N82-28810
YOUNG, P. N82-28274
YOUNG, S. G. N82-28441
YUE, G. K. N82-28839

Z

ZANELLO, P. N82-28791
ZARETSKY, E. V. N82-28644
ZAWISLAK, F. C. N82-29211
ZBOROVSKAYA, V. I. N82-28958
ZEMAL, J. N. N82-28375
ZESCH, J. N82-29213
ZHURAVLEV, B. V. N82-28982
ZIELINSKI, R. E. N82-28471
ZIMMERMAN, K. L. N82-29108
ZINOVYEVA, L. A. N82-28955
ZLEIWAS, D. L. N82-28438
ZOBRIST, A. L. N82-28727
ZOBY, E. V. N82-28575
ZOLLA, A. E. N82-28794
ZWEBEN, C. N82-28362
ZWICK, H. N82-28946

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ACADEMY OF SCIENCES (USSR), MOSCOW.

Turbulent heating and filament structure of field-aligned current with anomaous resistivity
[REPT-680] N82-28855

Instantons in the quark plasma. The role of Fermion zero modes
[REPT-677] N82-29174

On the nature of magnetic fields in the vicinity of Mars
[REPT-672] N82-29249

Distribution of the magnetic field in Halley's comet tail obtained from the plasma cloud kinetics
[REPT-673] N82-29250

Solar wind magnetic field penetration into cometary ionospheres
[REPT-685] N82-29254

ACCUMETRICS CORP., CAMBRIDGE, MASS.

Micro-g triaxial piezoelectric satellite accelerometer system development
[AD-A113849] N82-28347

ACRES AMERICAN, INC., COLUMBIA, MD.

Conceptual design and engineering studies of adiabatic Compressed Air Energy Storage (CAES) with thermal energy storage
[DE82-005483] N82-28823

AERONAUTICAL RESEARCH INST. OF SWEDEN, STOCKHOLM.

Measuring the flow properties of slotted test-section walls
[FFA-135] N82-28571

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).

A study of wind shear effects on aircraft operations and safety in Australia
[ARL-SYS-REPT-24] N82-28265

Programs for the transonic wind tunnel data processing installation. Part 8: Programs for processing data on the central site computer
[AD-A112900] N82-28310

Design basis for a new transonic wind tunnel
[AD-A112899] N82-28311

A design study for a meteorological instrumentation system for an Omega tower
[AD-A112868] N82-28906

AEROSPACE CORP., EL SEGUNDO, CALIF.

SD/LDEF technical User's Manual
[AD-A113504] N82-28324

Improvement of transverse strength in graphite-aluminum composites by high-strength surface foils
[AD-A114105] N82-28360

CO2 laser photoacoustic detection of hydrazine based rocket fuels
[AD-A112950] N82-28632

The removal of DF (v = 3 and 4) by H and D atoms
[AD-A114436] N82-28635

Auroral particle distribution functions and their relationships to inverted Vs and auroral arcs
[AD-A114365] N82-28867

Galactic radiation belts
[AD-A111836] N82-29244

Determination of the intrinsic Q(3)/5(1) line intensity ratio of molecular hydrogen
[ATR-82(8415)-1] N82-29247

Solar observations from the P78-1 satellite
[AD-A112873] N82-29257

AEROSPACE CORP., LOS ANGELES, CALIF.

Navstar/Global Positioning System N82-28719

AEROSPACE MEDICAL RESEARCH LABS., WRIGHT-PATTERSON AFB, OHIO.

Comparative vertical impact testing of the F/FB-111 crew restraint system and a proposed modification
[AD-A113957] N82-28267

Field studies of the Air Force procedures (NOISECHECK) for measuring community noise exposure from aircraft operations
[AD-A113672] N82-28841

AIR FORCE ENGINEERING AND SERVICES CENTER, TYNDALL AFB, FLA.

Smoke abatement system for crash rescue/fire training facilities
[AD-A114380] N82-28268

AIR FORCE ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER, SCOTT AFB, ILL.

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Randolph AFB, San Antonio, Texas. Parts A-F
[AD-A113704] N82-28887

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Taegu AB, Korea. Parts A, C-F
[AD-A113228] N82-28889

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Lajes AB, Azores. Parts A-F
[AD-A113227] N82-28890

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Forbes Fld, Kansas. Parts A-F
[AD-A113226] N82-28891

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Thule AB, Greenland. Parts A-F
[AD-A113225] N82-28892

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Burlington IAP, Vermont. Parts A-F
[AD-A113224] N82-28893

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Atlantic City, New Jersey. Parts A-F
[AD-A113180] N82-28894

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Kansas City IAP, Missouri. Parts A-F
[AD-A113179] N82-28895

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Bangor International/Dow AFB, Maine. Parts A-F
[AD-A113178] N82-28896

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Scott AFB, Belleville, Illinois. Parts A-F
[AD-A113177] N82-28897

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Amarillo MAP, Texas. Parts A-F
[AD-A113176] N82-28898

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Edmonton IAP, Alberta, Canada. Parts A-F
[AD-A113175] N82-28899

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Nellis AFB, Las Vegas, Nevada. Parts A-F
[AD-A113154] N82-28900

Revised Uniform Summary of Surface Weather Observations (RUSSWO). McConnell AFB, Wichita, Kansas. Parts A-F
[AD-A113155] N82-28901

AIR FORCE GEOPHYSICS LAB., HANSCOM AFB, MASS.

Improved 35 GHz radiometer for solar burst measurements
[AD-A113139] N82-29256

AIR FORCE HOSPITAL, WIESBADEN (WEST GERMANY).

An industrial hygiene evaluation of aircraft refueling inside closed aircraft shelters at elevated ambient temperatures
[AD-A114396] N82-28994

AIR FORCE HUMAN RESOURCES LAB., BROOKS AFB, TEX.

Manual reversion flight control system for A-10 aircraft: Pilot performance and simulator cue effects
[AD-A113463] N82-28302

AIR FORCE ROCKET PROPULSION LAB., EDWARDS AFB, CALIF.

An analysis of solid propellant transient viscoelastic response under motor ignition conditions
[AD-A114345] N82-28467

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.

International aviation (selected articles)
[AD-A114422] N82-28245

China's ballistic missile program
[AD-A114260] N82-28321

The relationship between ballistic behavior and structural microdefects of T propellant. An application of SEM in the study of doublebase propellant
[AD-A114381] N82-28351

The development and application of the magnetron
[AD-A114155] N82-28560

Fundamentals of electrical propulsion plant design
[AD-A114423] N82-28561

Local and regional winds: Their names and attributes
[AD-A114224] N82-28908

Storm warnings on Lake Balaton
[AD-A114322] N82-28909

Bulletin of hydrological and meteorological Service, selected articles
[AD-A114382] N82-28910

Particle beam weapons
[AD-A114383] N82-29147

Polarized Quasi-Optical phase shifter
[AD-A114300] N82-29165

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.

High temperature damping of dynamic systems N82-28661

AIR WEATHER SERVICE, SCOTT AFB, ILL.

Climatology tables for 7 Corps forward areas
[AD-A113034] N82-28902

East Coast fog: A case study
[AD-A113110] N82-28903
AKRON UNIV., OHIO.
Threshold tear strength of elastomers
[AD-A114239] N82-28452
The effect of strain upon the velocity of sound and the velocity of free retraction for natural rubber
[AD-A114238] N82-28453
Crack velocities in natural rubber
[AD-A114298] N82-28677
ALABAMA UNIV., HUNTSVILLE.
Recent develoments in hygrothermoviscoelastic analysis of composites N82-28676
ALLIS-CHALMERS MFG. CO., YORK, PA.
Powerhouse-gate: Concept definition study
[DE82-006226] N82-28834
ALTUS CORP., SAN JOSE, CALIF.
High energy density battery lithium thionyl chloride improved reverse voltage design
[AD-A113498] N82-28794
AMERICAN UNIV., WASHINGTON, D. C.
Requirements and alternatives for a management information system to support hazardous waste enforcement
[PB82-154410] N82-29231
AMES LAB., IOWA.
Proximity effect in Cu-NbSn composites
[DE82-005449] N82-28361
Kinetics of the reverse Deacon reaction
[DE82-005621] N82-28394
Study of hydrogen in coals, polymers, oxides, and muscle water by nuclear magnetic resonance: Extension of solid state high resolution techniques
[DE82-005454] N82-28395
Coordination chemistry of several radius-sensitive complexones and applications to lanthanide-actinide separations
[DE82-005547] N82-28396
Kinetic studies of organochromium (3) cations and their hydrido analog
[DE82-005581] N82-28397
Electrocatalysis of the oxidations of some organic compounds on noble-metal electrodes by foreign-metal ad-atoms
[DE82-005619] N82-28406
Thermotransport of hydrogen and deuterium in vanadium, niobium and tantalum alloys
[DE82-005453] N82-28424
Mechanistic chemistry of some transition metal complexes
[DE82-005577] N82-28425
Electrodynamics: A consequence of nonlinear realizations of the Lorentz group
[DE82-004775] N82-28531
Processing and properties of Zn0 based varistors
[DE82-005583] N82-28565
Crystal and molecular structures of selected organic and organometallic compounds and an algorithm for empirical absorption correction
[DE82-005451] N82-29210
ANALYTICAL MECHANICS ASSOCIATES, INC., HAMPTON, VA.
Terminal area automatic navigation, guidance, and control research using the Microwave Landing System (MLS). Part 4: Transition path reconstruction along a straight line path containing a glideslope change waypoint
[NASA-CR-3574-PT-4] N82-28269
Reconstruction of the 1st Space Shuttle (STS-1) entry trajectory
[NASA-CR-3561] N82-28313
APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
Evolutionary charts of solar activity (calcium plages) as functions of heliographic longitude and time
[UAG-81] N82-29255
ARGONNE NATIONAL LAB., ILL.
Solid-state high common-mode battery cell voltage scanner: Design report
[DE82-007032] N82-28569
OTEC biofouling, corrosion, and materials study from a moored platform at Punta Tuna, Puerto Rico
[DE82-007037] N82-28947
Energy and solid/hazardous waste
[DE82-006964] N82-29152
ARINC RESEARCH CORP., ANNAPOLIS, MD.
Cost analysis of the discrete Address Beacon System for the low-performance general aviation aircraft community
[AD-A112957] N82-28274
Evaluation of various navigation system concepts
[AD-A112919] N82-28275
ARIZONA STATE UNIV., TEMPE.
New look at long-term collector performance and utilizability
[DE82-005259] N82-28799
Dynamic analysis and simulation of a large scale thermal simulator
[DE82-005588] N82-28802
Design and validation of a thermal simulator for solar system performance testing
[DE82-005589] N82-28803
ARIZONA UNIV., TUCSON.
Compliant surfaces
[AD-A114309] N82-29166
ARKANSAS UNIV., LITTLE ROCK.
Physiological studies of heat stress acclimation during a specific exercise regimen
[AD-A111897] N82-28991
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, ABERDEEN PROVING GROUND, MD.
Extinction by aerosol clouds of nonspherical particles at arbitrary wavelengths
[AD-A113535] N82-29163
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
Six-degree-of-freedom (6-DOF) simulator for weapon testing
[AD-A113536] N82-28308
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
Thermal relaxation in autofrettaged cylinders
[AD-A113210] N82-28672
ARMY AVIATION ENGINEERING FLIGHT ACTIVITY, EDWARDS AFB, CALIF.
HISS calibration, ice phobics and FAA R/D evaluations
[AD-A114435] N82-28289
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, CLEVELAND, OHIO.
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
A finite element stress analysis of spur gears including fillet radii and rim thickness effects
[NASA-TM-82865] N82-28646
ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, ST. LOUIS, MO.
National Transonic Facility (NTF) prototype fan blade fatigue test
[AD-A114405] N82-28261
Historical research and development inflation indices for Army fixed and rotor winged aircraft
[AD-A114368] N82-28290
ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
MIZEX. A program for mesoscale air-ice ocean interaction experiments in Arctic marginal ice zones. 1: Research strategy
[AD-A107046] N82-28740
Charged dislocation in ice. 2: Contribution of dielectric relaxation
[AD-A113936] N82-29204
ARMY COMMUNICATIONS-ELECTRONICS COMMAND, FORT MONMOUTH, N.J.
Total electron content variations at mid-and high-latitudes
[AD-A113683] N82-28860
ARMY CONSTRUCTION ENGINEERING RESEARCH LAB., CHAMPAIGN, ILL.
Evaluation of applicability of standard CW EMI/RFI shielding effectiveness test techniques to assessment of EMP hardness of tactical shelters
[AD-A113042] N82-28517
Preparing and communicating habitability design information
[AD-A113379] N82-28518
ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND, FORT BELVOIR, VA.
Night vision and electro-optics technology transfer, 1972 - 1981
[AD-A114134] N82-29167
ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Geotechnical computer program survey
[AD-A114106] N82-28481
ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
Anisotropic embrittlement in high-hardness ESR 4340 steel forgings
[AD-A113906] N82-28412
Requirements for flexure testing of brittle materials
[AD-A113937] N82-28447
ARMY MISSILE COMMAND, REDSTONE ARSENAL, ALA.
Laser-induced reactions of nitrogen fluorides with nitrogen oxides
[AD-A113667] N82-28626
ARMY RESEARCH AND TECHNOLOGY LABS., MOFFETT FIELD, CALIF.
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252
ARMY RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS.
Acclimatization to dry heat: Active men versus active women
[AD-A111708] N82-28993
ARMY TROOP SUPPORT COMMAND, ST. LOUIS, MO.
Historical inflation program. A computer program generating historical inflation indices for Army aircraft
[AD-A114053] N82-29232
ASTRONOMISCHE GESELLSCHAFT, HAMBURG (WEST GERMANY).
Astronomical Society information number 55. Report of the meeting
[ISSN-0374-1958] N82-29241
ATMOSPHERIC SCIENCES LAB., WHITE SANDS MISSILE RANGE, N. MEX.
Program listings for EOSAEL 80-B and ancillary codes AGAUS and FLASH. Volume 2: User's manual supplement
[AD-A114417] N82-29054
ATOMIC ENERGY OF CANADA LTD., PINAWA (MANITOBA).
Energy in Canada. Review and perspective
[DE81-700548] N82-28837
AUBURN UNIV., ALA.
Reliability growth of continuous systems
[AD-A114099] N82-28658
AUTOMATION INDUSTRIES, INC., SILVER SPRING, MD.
Solar energy system performance evaluation: Summerwood Associates, House G, Old Saybrook, connecticut, June 1980 - May 1981
[DE82-004408] N82-28806
National solar data program performance results, volume 4
[DE82-002536] N82-28808
Environmental data for sites in the National Solar Data Network, October 1981
[DE82-002706] N82-28850

B

BALL STATE UNIV., MUNCIE, IND.
Development of slide program describing site-selection process for Small Wind Energy Conversion Systems (SWECS)
[DE82-006209] N82-28831
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
Surface pressure measurements on a boattailed projectile shape at transonic speeds
[AD-A113520] N82-28258
Kinematic investigation Hughes Helicopter 7.62mm chain gun
[AD-A113114] N82-28287
Combustion studies of Very High Burning Rate (VHBR) propellants
[AD-A113029] N82-28465
Ascending and asymptotic series for squares, products and cross-products of modified Bessel functions
[AD-A113307] N82-29108
BATTELLE COLUMBUS LABS., OHIO.
Chemical structure by laser-produced X-rays
[AD-A113864] N82-28627
Trend inspection station for printed circuit board soler joints, ultrasonic subsystem
[AD-A112918] N82-28655

BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.
Radon diffusion through multilayer earthen covers: Models and simulations
[DE82-001420] N82-29138

BDM CORP., MONTEREY, CALIF.
Calibration and application of a combination temperature-pneumatic probe for velocity and rotor loss distribution measurements in a compressor
[AD-A113834] N82-28608

BEDFORD RESEARCH ASSOCIATES, MASS.
Impact of finite precision arithmetic on algorithm design, part 1
[AD-A113981] N82-29076

BEERS (ROLAND F.), INC., ALEXANDRIA, VA.
Electron beam transport in the ionosphere: Energy deposition and optical emissions based upon the combined effects of plasma turbulence and particle-particle interactions
[AD-A114376] N82-28868

BELL-NORTHERN RESEARCH LTD., OTTAWA (ONTARIO).
A virtual space video conferencing demonstration system
[AD-A114120] N82-28526
A multi-bit rate interface movement compensated multimode coder for video conferencing
[AD-A114121] N82-28527
Audio conferencing using dynamic channel-assignment system
[AD-A114122] N82-28528
Network specifications for a virtual space teleconferencing system
[AD-A114119] N82-28530

BENDIX CORP., KANSAS CITY, MO.
Environmental chamber low temperature cutoff
[DE82-007626] N82-28316
Molybdenum and its analyses
[DE82-007645] N82-28430

BOEING AEROSPACE CO., KENT, WASH.
Cryogenic performance of slotted brazed Rene 41 honeycomb panels
[NASA-CR-3525] N82-28664

BOEING AEROSPACE CO., SEATTLE, WASH.
Feasibility study of a 270V dc flat cable aircraft electrical power distributed system
[AD-A114026] N82-28552

BOEING CO., SEATTLE, WASH.
Solar project description for Saddle Hill Trust: Lot 77, single family residence, Medway, Massachusetts
[DE82-003326] N82-28807

BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296

BOEING COMPUTER SERVICES, INC., SEATTLE, WASH.
Intermediate photovoltaic system application experiment operational performance report. Volume 3: Mt. Laguna Radar Station, Mt. Laguna, California
[DE82-003006] N82-28809
Intermediate photovoltaic system application experiment operational performance report. Volume 4: Mt. Laguna Radar Station, Mt. Laguna, Calif.
[DE82-007565] N82-28835
Intermediate photovoltaic system application experiment operational performance report. Volume 5: Newman Power Station Site, El Paso, Tex.
[DE82-007566] N82-28836

BOEING COMPUTER SERVICES CO., TUKWILA, WASH.
Implementation of the Gibbs-Poole-Stockmeyer algorithm and the Gibbs-King algorithm
[AD-A113104] N82-29078

BOEING ENGINEERING AND CONSTRUCTION, SEATTLE, WASH.
Wind resource analysis for the Tennessee Valley authority region, volume 1
[DE82-004927] N82-28913
Wind energy resource atlas. Volume 2: TVA power service area
[DE82-004877] N82-28914
Wind resource analysis for the Tennessee Valley authority region, volume 3
[DE82-006196] N82-28915
Wind resource analysis for the Tennessee Valley authority region, volume 4
[DE82-005103] N82-28916

BOEING MILITARY AIRPLANE DEVELOPMENT, SEATTLE, WASH.
Advanced aircraft electrical system control technology demonstrator. Phase 1: Analysis and preliminary design
[AD-A113633] N82-28284

BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
Analytical and simulator study of advanced transport
[NASA-CR-3572] N82-28298
Development of a good-quality speech coder for transmission over noisy channels at 2.4 kb/s
[AD-A114068] N82-28510
Distributed operating system design study, volume 1
[AD-A113172] N82-29067
Distributed operating system design study, volume 2
[AD-A113173] N82-29068

BOLT, BERANEK, AND NEWMAN, INC., CANOGA PARK, CALIF.
Industrial machinery noise impact modeling, volume 1
[PB82-148099] N82-29121
Industrial machinery noise impact modelling. Volume 2: Appendices
[PB82-148107] N82-29122

BOOZ-ALLEN AND HAMILTON, INC., BETHESDA, MD.
Case studies of innovation in R and D planning
[DE82-901277] N82-29222

BOSTON UNIV., MASS.
Airglow imaging studies of natural and artificially induced ionospheric disturbances
[AD-A114369] N82-28866

BOWIE STATE COLL., MD.
Autonomous scheduling technology for Earth orbital missions
[NASA-CR-168939] N82-29217

BRIGHAM YOUNG UNIV., PROVO, UTAH.
Pioneer 10/11 data analysis of the magnetic field experiment
[NASA-CR-166366] N82-29251

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Rapid hydropyrolysis of sub-bituminous and bituminous coals
[DE82-000776] N82-28469
Photovoltaics and electric utilities
[DE82-006994] N82-28833
Stability of superconducting ISABELLE dipole magnets
[DE82-006843] N82-29190

BROWN UNIV., PROVIDENCE, R. I.
Investigation of the tensile deformation and fracture of dual-phase steel
[DE82-007522] N82-28682

BUREAU OF MINES, AMARILLO, TEX.
Automatic and continuous transducer-drift compensator for endpoint detection systems
[PB82-135534] N82-28614

BUREAU OF MINES, AVONDALE, MD.
A pyrometallurgical method for processing Ni-Cd scrap batteries
[PB82-145426] N82-28435

BUREAU OF MINES, RENO, NEV.
Magnetic properties of alloys containing mischmetal, cobalt, copper, iron, and magnesium
[PB82-158940] N82-28439

BUREAU OF MINES, ROLLA, MO.
Electrolytic method for recovery of lead from scrap batteries
[PB82-141045] N82-28437
Consolidation of an iron-base superalloy by powder metallurgy techniques
[PB82-135906] N82-28493

BUREAU OF MINES, WASHINGTON, D. C.
Cobalt availability-domestic: A minerals availability system appraisal
[PB82-135435] N82-28438
Alumina availability - Domestic: A mineral availability system appraisal
[PB82-135468] N82-28769
Bureau of Mines research 1981: A summary of significant results in mineral technology and economics
[PB82-159971] N82-28776

C

CALIFORNIA INST. OF TECH., PASADENA.
Research on augmentation of turbulent mixing
[AD-A114310] N82-28591

CALIFORNIA UNIV., BERKELEY.
Energy paths in chemical reactions
[AD-A114191] N82-28609
Aseismic base isolation N82-28662
A design methodology for nonlinear systems containing parameter uncertainty: Application to nonlinear controller design
[NASA-CR-166358] N82-29005

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Chemistry and morphology of coal liquefaction
[DE82-005141] N82-28392
Photocatalytic hydrogen production from water and intermetallic compound formation on single-crystal surfaces of titanium oxides
[DE82-004952] N82-28393
Fatigue properties of quatough steels Fe/4Cr/XMn/0.25C
[DE82-005140] N82-28421
Fatigue crack propagation thresholds for long and short cracks in Rene 95 nickel-base superalloy
[DE82-005135] N82-28422
Influences of gaseous environment on low growth-rate fatigue crack propagation in steels
[DE82-005134] N82-28423
Computerized, Instrumented, Residential Analysis (CIRA)
[DE82-004560] N82-28484
Electrodeless fluorescent lamp
[DE82-005147] N82-28564
Oil shale and coal research FY 1980
[DE82-002825] N82-28751
Biomass energy conversion in Hawaii
[DE82-005139] N82-28801
Impregnated filters for the determination of formaldehyde in indoor environments
[DE82-004025] N82-28852
Marine sciences group
[DE82-005145] N82-28940
NMR studies of oriented molecules
[DE82-005258] N82-29134
Effect of vibrational excitation on the dynamics of ion molecule reactions
[DE82-004951] N82-29135
Meson production in relativistic-heavy-ion collisions
[DE82-005652] N82-29141
Study of correlations in molecular motion by multiple quantum NMR
[DE82-005650] N82-29144

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Use of metallic glasses in magnetic switching
[DE82-006736] N82-28456
Plant design and economic analysis for solar coal gasification
[DE82-003178] N82-28468
Laboratory-scale simulation of underground coal gasification: Experiment and theory
[DE82-001063] N82-28470
Solving the Navier-Stokes equations with LSODI and the method of lines
[DE82-006179] N82-28594
Project Vulcan: The development of a gasdynamic heater. Volume 2: Heat transfer and performance analyses for a gasdynamic heater with helical impellers
[DE82-006788] N82-28595
Oil shale project large retort run summary run L-3
[DE82-005109] N82-28764
Strategies for steam handling and H2S abatement at geothermal power plants in the geysers area of Northern California
[DE82-001144] N82-28796
Rotary kiln for the solar decomposition of zinc sulfate
[DE82-004323] N82-28804
Rapidly-refuelable 167-CM(2) aluminum-air power cell
[DE82-006251] N82-28826
Analysis of the atmospheric aerosol size distribution information retrievable from near-limb angular radiance measurements taken on Mauna Loa, Hawaii
[DE82-005999] N82-28851

Computer models to support investigations of surface subsidence and associated ground motion induced by underground coal gasification
[DE82-004936] N82-28871
Praxis text I/O package: An overview of the Praxis routines to handle Text I/O
[DE82-006250] N82-29060
Tables and graphs of photon-interaction cross sections from 0.1 keV to 100 MeV derived from the LLL evaluated-nuclear-data library
[DE82-004819] N82-29139
Thermo-optical properties of optical glasses
[DE82-003681] N82-29169
Mirror fusion test facility status
[DE82-006187] N82-29185
Plasmas in particle accelerators: A hydrodynamic model of three-dimensional electrostatic instabilities
[DE82-006182] N82-29186

CALIFORNIA UNIV., RIVERSIDE.
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, Part 1
[AD-A113665] N82-28842
Atmospheric chemistry of hydrocarbon fuels. Volume 2: Outdoor chamber data tabulations, part 2
[AD-A113666] N82-28843

CALIFORNIA UNIV., SAN DIEGO.
Pioneer 10/11 data analysis of the trapped radiation experiment
[NASA-CR-166360] N82-28312

CALIFORNIA UNIV., SANTA BARBARA.
The use of a perfectly conducting sphere to excite the plasmon of a flat surface. 1: Calculation of the local field with applications to surface enhanced spectroscopy
[AD-A114278] N82-28384
Surface enhanced spectroscopy
[AD-A114274] N82-28385

CALSPAN ADVANCED TECHNOLOGY CENTER, BUFFALO, N.Y.
Project Vulcan: The development of a gasdynamic heater. Volume 2: Heat transfer and performance analyses for a gasdynamic heater with helical impellers
[DE82-006788] N82-28595

CAMBRIDGE UNIV. (ENGLAND).
An integrated communications demand model
[PB82-141292] N82-28539
Computer program description: An improved finite element program for three-dimensional electromagnetic problems
[PB82-134636] N82-28541
A first report on welding diagrams
[PB82-134602] N82-28653

CANYON RESEARCH GROUP, INC., WESTLAKE VILLAGE, CALIF.
Visual Technology Research Simulator (VTRS) human performance research: Phase 3
[AD-A112475] N82-28988
Unconventional visual displays for flight training
[AD-A111392] N82-28999

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Experimental nuclear and radiochemistry
[DE82-002925] N82-28402
Decentralized resource management in distributed computer systems
[AD-A113255] N82-29069

CARRIER CORP., SYRACUSE, N.Y.
Residential-scale ice-storage system for space cooling
[DE82-000165] N82-28482

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Chemical design of elastomeric behavior
[AD-A114335] N82-28454

CENTRE DE RECHERCHES SCIENTIFIQUES ET TECHNIQUES DE L'INDUSTRIE DES FABRICATIONS METALLIQUES, BRUSSELS (BELGIUM).
External loads on nozzles in cylindrical shells
[CRIF-MT-146] N82-28687

CENTRE NATIONAL D'ETUDES SPATIALES, TOULOUSE (FRANCE).
Computer-assisted circuit design masks for the production of microwave circuits
[PB82-140153] N82-28494

CENTURY WEST ENGINEERING CORP., SPOKANE, WASH.
Regional assessment of aquifers for thermal energy storage. Volume 1: Regions 1 through 6
[DE82-002507] N82-28827
Regional assessment of aquifers for thermal-energy storage. Volume 2: Regions 7 through 12
[DE82-002506] N82-28828
Regional assessment of aquifers for thermal-energy storage. Volume 3: Appendices
[DE82-002505] N82-28829

CHI ASSOCIATES, INC., ARLINGTON, VA.
Slurry walls as an integral part of underground transportation structures
[PB82-145061] N82-29238

CHICAGO UNIV., ILL.
Engineering development studies for integrated evacuated CPC arrays
[DE82-005676] N82-28568
Fundamentals and techniques of nonimaging optics for solar-energy concentration
[DE82-004885] N82-28830
Neutral interstellar gas in the lower galactic halo
N82-29246

CHRISTIAN MICHELSENS INSTITUTT FOR VIDENSKAP OG ANDSFRIHET, BERGEN (NORWAY).
NORSEX: Total and multiyear ice concentration at Svalbard in September and Octobe. 1979, mapped by satellite microwave sensor at frequencies 37 GHz and 10 GHz
[PB82-160029] N82-28775

CLARK COLL., ATLANTA, GA.
Summability methods for divergent integrals and their applications to singular Sturm-Liouville expansions
[AD-A113077] N82-29079

CLEMSON UNIV., S.C.
The basket method for selecting balanced samples. Part 2: Applications to price estimation
[AD-A112949] N82-29096

COAST GUARD, WASHINGTON, D.C.
Pacific area current charts
[AD-A112293] N82-28930

COLORADO STATE UNIV., FORT COLLINS.
Electric and magnetic fields
[NASA-CR-165604] N82-28350
Tropical cyclone motion: Environmental interaction plus a Beta effect
[ISSN-0067-0340] N82-28878
Image segmentation using simple Markov, field models
[AD-A112914] N82-29162

COLORADO UNIV., BOULDER.
Constitutive relations of randomly oriented steel fiber reinforced concrete under multiaxial compressive loadings
[AD-A114168] N82-28678

COLUMBIA UNIV., NEW YORK.
Numerical study of the Columbia high-beta device: Torus-2
[DE82-007363] N82-29187

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
NASA authorization for fiscal year 1983
[GPO-91-557] N82-29233

COMMUNICATIONS RESEARCH CENTRE, OTTAWA (ONTARIO).
Telidon Videotex presentation level protocol: Augmented picture description instructions
[CRC-TN-709-E] N82-28499

COMPTROLLER GENERAL OF THE UNITED STATES, WASHINGTON, D.C.
Electric vehicles: Limited range and high costs hamper commercialization
[EMD-82-38] N82-29234

COMPUTER SCIENCES CORP., BAY ST. LOUIS, MISS.
TNT equivalency of Cyclotol 70/30
[AD-A113270] N82-28459

COMPUTER SCIENCES CORP., GREENBELT, MD.
Structured FORTRAN preprocessor (SFORT) PDP-11/70 user's guide
[NASA-TM-84790] N82-29040
FORTHAN static source code analyzer program (SAP) user's guide, revision 1
[NASA-TM-84791] N82-29041
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) state-of-the-art computer systems/ compatibility study
[NASA-TM-84792] N82-29042
Automated collection of software engineering data in the Software Engineering Laboratory (SEL)
[NASA-TM-84766] N82-29043

COMPUTER SYSTEMS MANAGEMENT, INC., ARLINGTON, VA.
The design, development and application of advanced video and microcomputer-based command and control (C2) systems
[AD-A113742] N82-28511

CONTROL DATA CORP., MONTEREY, CALIF.
Time scales of systematic errors in a numerical weather forecast
[AD-A113374] N82-28888
Users manual for polar ice forecast subsystem: Arctic
[AD-A114351] N82-28932
Program maintenance manual polar ice forecast subsystem: Arctic
[AD-A114343] N82-28933

COOPER UNION, NEW YORK.
A comprehensive model to determine the effects of temperature and species fluctuations on reaction rates in turbulent reacting flows
[NASA-CR-169124] N82-28576

CORNELL UNIV., ITHACA, N. Y.
Ethanol production in Suffolk County, New York: Technical and economic feasibility
[PB82-145152] N82-28475
Computer-aided injection molding system
[PB82-147810] N82-28490
Integration of processes for wastewater residuals management
[PB82-147992] N82-28854
Controlled grain boundary structures in superconductors
[AD-A114243] N82-29208

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, PRETORIA (SOUTH AFRICA).
Experimental heat transfer coefficients for the cooling of oil in horizontal internal forced convective transitional flow
[PB82-142993] N82-28601

COURY AND ASSOCIATES, INC., LAKEWOOD, COLO.
Upstream H2S removal from geothermal steam
[DE82-901293] N82-28847

D

DANISH SPACE RESEARCH INST., LYNGBY.
Occurrences of the polar slant E condition (SEC) at Narssarssuaq, Godhavn, Thule, Denmark for 1980
N82-28873

DCW INDUSTRIES, STUDIO CITY, CALIF.
Numerical algorithm for rapid integration of turbulence-model equations on elliptic regions
[AD-A113013] N82-28583

DEFENCE RESEARCH ESTABLISHMENT, OTTAWA. (ONTARIO).
Frequency compression of wideband signals using a distributed sampling technique
[AD-A113428] N82-28519
Programming guide for colour graphics on the NORPAK VDP/VGS and VDP/RGS
[AD-A113429] N82-29046

DEFENCE RESEARCH ESTABLISHMENT VALCARTIER (QUEBEC).
Computer-aided design and fabrication of wire-wrap (trademark) type circuit boards: A new symbolism and its implementation
[AD-A113439] N82-28559

DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).
The effect of stress triaxiality on the occurrence of ductile fracture in low strength steels
[DRIC-T-6493] N82-28663
The use of polarographic and potentiometric methods in structural analysis
[DRIC-T-6575] N82-28667
The application of a bubbling mercury electrode to anodic stripping voltammetry. Determination of zinc, cadium, lead and copper in natural water and industrial waste
[DRIC-T-6565] N82-28791

DEFENSE MAPPING AGENCY, WASHINGTON, D.C.
Inertial surveying technology
[AD-A107379] N82-28863

DEFENSE SYSTEMS MANAGEMENT SCHOOL, FORT BELVOIR, VA.
Concepts, the Journal of Defense Systems Acquisition Management, Autumn 1981, volume 4, number 4
[AD-A113130] N82-29220

DELAWARE UNIV., NEWARK.
Zn3P2 as an improved semiconductor for photovoltaic solar cells
[DE82-004259] N82-28811

DEPARTMENT OF AGRICULTURE, WASHINGTON, D.C.
USDA registration and rectification requirements N82-28708

DEPARTMENT OF ENERGY, LAS VEGAS, NEV.
Nevada nuclear waste storage investigations
[DE82-005879] N82-29149
Nevada nuclear waste storage investigations
[DE82-004722] N82-29150

DEPARTMENT OF ENERGY, OAK RIDGE, TENN.
Energy data base: Subject thesaurus permutated listing
[DE82-005770] N82-29229

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, WASHINGTON, D. C.
Solar project description for Saddle Hill Trust: Lot 77, single family residence, Medway, Massachusetts
[DE82-003326] N82-28807

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, GOETTINGEN (WEST GERMANY).
Calculation of the unsteady pressure distribution on an oscillating cascade with thick profiles and steady turning angle
[DFVLR-FB-81-38] N82-28600

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, OBERPFAFFENHOFEN (WEST GERMANY).
Offset reflector antennas: Design, computation, construction and pattern measurements
[DFVLR-MITT-81-33] N82-28535
Critical assessment of a series of lidar aerosol measurement results
[DFVLR-FB-82-03] N82-28853

DEUTSCHER WETTERDIENST, HOHENPEISSENBERG (WEST GERMANY).
Special observations by the Hohenpeissenburg Meteorological Observatory. No. 44: Results of aerological and surface ozone measurements during the first semester of 1981
[ISSN-0581-1287] N82-28877

DEUTSCHER WETTERDIENST, OFFENBACH AM MAIN (WEST GERMANY).
Reports from the German Meteorological Service. Number 156: Statistics for the global radiation at eight stations of the German Meteorological Service
[ISSN-0072-4130] N82-28857
Second International Ozone Sonde Intercomparison Conference, 5-20 April 1978
[ISSN-0012-4130] N82-28858
Reports from the German Meteorological Service. Number 158: Contribution to phenology of Europe 4 long term phenological observation series for western, central, and eastern Europe
[ISSN-0072-4130] N82-28876

DOTY ASSOCIATES, ROCKVILLE, MD.
Study of increasing lead times in major weapon systems acquisition
[AD-A113459] N82-29221

DOWTY ROTOL LTD., GLOUCESTER (ENGLAND).
Fifteen years experience with composite propeller blades N82-28363

DRAPER (CHARLES STARK) LAB., INC., CAMBRIDGE, MASS.
Materials research for advanced inertial instrumentation. Task 1: Dimensional stability of gyroscope structural materials
[AD-A113497] N82-28273
Materials research for advanced inertial instrumentation. Task 2: Gas bearing material development
[AD-A113518] N82-28649

E

E-SYSTEMS, INC., ST. PETERSBURG, FLA.
Electronically tunable amplifier technology
[AD-A113193] N82-28555
Electronically tunable phase locked loop oscillator
[AD-A113253] N82-28556

EARTHQUAKE ENGINEERING RESEARCH INST., BERKELEY, CALIF.
Two-dimensional hybrid modelling of soil-structure interaction
[PB82-142118] N82-28489

EASTMAN KODAK CO., ROCHESTER, N. Y.
Ultra-lightweight mirror manufacturing and radiation response study
[AD-A106998] N82-29157

ECLECTECH ASSOCIATES, INC., NORTH STONINGTON, CONN.
Aids to navigation principal findings on the CAORF experiment. The performance of visual aids to navigation as evaluated by simulation
[AD-A107045] N82-28271

EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
Preliminary conceptual design for geothermal space heating conversion of school district 50 joint facilities at Pagosa Springs, Colorado. GTA report no. 6
[DE82-005245] N82-28800

EDGERTON, GERMESHAUSEN AND GRIER, INC., LAS VEGAS, NEV.
Aerial radiological and photographic survey of eleven atolls and two islands within the Northern Marshall Islands. Dates of surveys, July-November 1978
[DE82-005584] N82-28752

EIKONIX CORP., BEDFORD, MASS.
Application of phase retrieval
[AD-A113383] N82-29161

ELECTRIC POWER RESEARCH INST., PALO ALTO, CALIF.
Stress corrosion cracking of alloy 600
[DE82-901313] N82-28429

ELECTRICITY COUNCIL RESEARCH CENTRE, CAPENHURST (ENGLAND).
High gradient magnetic separation applied to liquid-liquid separation
[PB82-142811] N82-28495

ELECTROCHEMICAL TECHNOLOGY CORP., SEATTLE, WASH.
Determination of the effect of composition, structure and electrochemical mass transport properties on adhesion and corrosion inhibition of paint films
[AD-A113975] N82-28448

ELECTRONICS RESEARCH LAB., ADELAIDE (AUSTRALIA).
The choice of a laser for airborne depth sounding
[AD-A112901] N82-28629
Evaluation of the performance of a laser for airborne depth sounding
[AD-A112907] N82-28630
Laser hydrography in Australia
[AD-A113584] N82-28741

ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., CONCORD, MASS.
Comparison of theoretical and actual satellite microwave brightness temperatures to determine snowpack properties
[PB82-161118] N82-28774

ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., LEXINGTON, MASS.
Mini raster-to-vector conversion
[AD-A113004] N82-28742

ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
Design study for a low-distortion holographic HUD
[AD-A113982] N82-28292
A quantitative assessment of resampling errors N82-28728
Fine resolution imaging of space objects
[AD-A113911] N82-29160

ENVIRONMENTAL SYSTEMS RESEARCH INST., REDLANDS, CALIF.
Inventory of available data elements for the San Bernardino, California region
[NASA-CR-166354] N82-28698

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH, GENEVA (SWITZERLAND).
Proceedings of the 1980 CERN School of Computing
[CERN-81-03] N82-29017

F

FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
A compendium of lightning effects on future aircraft electronic systems
[AD-A114117] N82-28293

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
General aviation activity and avionics survey
[AD-A112924] N82-28244

FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D. C.
A report of the technological aspects of regulatory-policy issues of geostationary platforms
[PB82-142191] N82-28540

FEDERAL HIGHWAY ADMINISTRATION, WASHINGTON, D.C.
Fiber optics technological review and assessment for traffic control
[PB82-145616] N82-29173

FIBER MATERIALS, INC., BIDDEFORD, MAINE.
Low cost 2-D heatshield materials
[AD-A113928] N82-28355

FOM-INSTITUUT VOOR PLASMAFYSICA, RIJNHUIZEN (NETHERLANDS).
Experimental studies of anomalous plasma heating in TORTUR 2
[REPT-82-141] N82-29200

FONDAZIONE UGO BORDONI, ROME (ITALY).
Availability analysis of a multiplex system
[FUB-30-1981] N82-28533
Methodology for the description and validation of communication protocols
[FUB-31-1981] N82-28534
Polynomial signals and polynomial transformations
[FUB-28-1981] N82-29066
Fundamentals of number theory and polynominals algebra for numerical signal processing
[FUB-27-1981] N82-29087

FORD AEROSPACE AND COMMUNICATIONS CORP., NEWPORT BEACH, CALIF.
Continuum absorption by H2O
[AD-A112264] N82-28372

FOREST PRODUCTS LAB., MADISON, WIS.
Analysis of continuous beams with joint slip
[AD-A107112] N82-28869

FORSCHUNGSINSTITUT BERGHOF G.M.B.H., TUEBINGEN (WEST GERMANY).
Production of improved silicon carbide filaments for composite materials
[PB82-138256] N82-28366

FORSCHUNGSINSTITUT FUER ANTHROPOTECHNIK, BONN (WEST GERMANY).
The ranking of displays based on transinformation
[FB-52] N82-29001

FRANKLIN RESEARCH CENTER, PHILADELPHIA, PA.
Electrothermal analytical response inspection of electroexplosive devices
[AD-A112328] N82-28461
Survey of commercial thermal-storage installations in the United States and Canada
[DE82-000131] N82-28797

G

GARD, INC., NILES, ILL.
Acoustic emission monitoring of production armor plate welds
[AD-A114419] N82-28650

GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
Computer outages at air terminal facilities and their correlation to near miss mid-air collisions (AFMD-82-43)
[B-206064] N82-28264
Probable impacts of budgets reductions on the development and use of photovoltaic energy systems
[EMD-82-60] N82-28781

GENERAL DYNAMICS/FORT WORTH, TEX.
Research model wing/tail fabrication
[AD-A114101] N82-28288

GENERAL ELECTRIC CO., CINCINNATI, OHIO.
CF6 jet engine performance improvement: High pressure turbine active clearance control
[NASA-CR-165556] N82-28297

GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Tensile and fatigue strength properties of Kevlar 29 aramid/epoxy unidirectional composites
[DE82-006777] N82-28362
Spaceborne scanner imaging system errors N82-28713
Geometric error characterization and error budgets N82-28729
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Investigation for low-cost permanent magnets
[AD-A107392] N82-29109
GEOLOGICAL SURVEY, CHARLESTON, W. VA.
Water resources data for West Virginia, water year 1980. Appendix: Coal areas
[PB82-159674] N82-28778
GEOLOGICAL SURVEY, FLAGSTAFF, ARIZ.
Registration and rectification needs of geology N82-28710
GEOLOGICAL SURVEY, JACKSON, MISS.
Water resources data for Mississippi, water year 1980
[PB82-149006] N82-28773
GEOLOGICAL SURVEY, RESTON, VA.
Map projections for larger-scale mapping N82-28722
An automated mapping satellite system N82-28734
Interpretation of time-domain electromagnetic soundings in the Calico Hills area, Nevada Test Site, Nye County, Nevada
[DE82-004260] N82-28869
GEOLOGICAL SURVEY, UNIVERSITY, ALA.
Water resources data for Alabama, water year 1980. Volume 1: Apalachicola Choctawatchee, Blackwater, Escambia, Perdido, and Alabama River Basins
[PB82-164112] N82-28777
GEOLOGICAL SURVEY, WASHINGTON, D. C.
Biota and biological principles of the aquatic environment
[CIRC-848-A] N82-28688
US Geological Survey activities, fiscal year 1981
[CIRC-875] N82-28689
US Geological Survey research in radioactive waste disposal, fiscal year 1979
[USGS-CIRC-847] N82-29145
GEORGIA INST. OF TECH., ATLANTA.
Helicopter vibration suppression using simple pendulum absorbers on the rotor blade
[NASA-CR-169131] N82-28282
Research program in fully distributed processing systems
[AD-A114199] N82-29018
GEORGIA UNIV., ATHENS.
Map accuracy requirements: The cartographic potential of satellite image data N82-28721
GRAZ UNIV. (AUSTRIA).
A PCM encoder for balloon sondes
[INW-8102] N82-28344
Study of low energy electron flux and its reaction to active experimentation on Spacelab
[INW-8101] N82-28612
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Hydraulic Universal Display Processor System (HUDPS)
[AD-A114428] N82-28294
GTE SYLVANIA, INC., TOWANDA, PA.
Tungsten alloy fabrication of penetrator materials
[AD-A114187] N82-28419

H

HAMILTON STANDARD, HARTFORD, CONN.
Slow opening valve
[NASA-CASE-MSC-20112-1] N82-28641
HARRIS CORP , MELBOURNE, FLA.
Tent shaped phased array rests
[AD-A113191] N82-28516
HARRY DIAMOND LABS., ADELPHI, MD.
On the nonlinear conductivity tensor for an unmagnetized relativistic turbulent plasma
[AD-A113699] N82-29176
HARVARD UNIV., CAMBRIDGE, MASS.
The role of microorganisms in marine corrosion processes
[AD-A114424] N82-28386
Decision algorithms for multiplayer games of incomplete information
[AD-A114334] N82-29053
HARVEY MUDD COLL., CLAREMONT, CALIF.
Use of metallic glasses in magnetic switching
[DE82-006736] N82-28456
HIGH LIFE HELICOPTERS, INC., PUYALLUP, WASH.
Airborne gamma-ray spectrometer and magnetometer survey: Crescent quadrangle, Burns quadrangle, Canyon City quadrangle, Bend quadrangle, Salem quadrangle (Oregon)
[DE81-029063] N82-28749
HONEYWELL CORPORATE MATERIAL SCIENCES CENTER, BLOOMINGTON, MINN.
Alkali halide FLIR lens development
[AD-A113845] N82-29158
HONEYWELL, INC., ST. PETERSBURG, FLA.
Reconfiguring redundancy management
[NASA-CASE-MSC-18498-1] N82-29013
HOUSTON UNIV., TEX.
Endor studies of radiation-produced trapped electrons and radicals in disordered systems and radical matrix interactions in polymers and on surfaces
[AD-A114321] N82-28455
HOWARD UNIV., WASHINGTON, D. C.
Controllability of inherently damped large flexible space structures
[NASA-CR-169127] N82-28345
HUGHES AIRCRAFT CO., FULLERTON, CALIF.
Near field antenna measurement system
[AD-A114125] N82-28522
HUGHES AIRCRAFT CO., TORRANCE, CALIF.
Multimode amplifier
[AD-A113254] N82-28557
HUGHES RESEARCH LABS., MALIBU, CALIF.
Liquid crystal materials for matrix displays
[AD-A114444] N82-29207

I

IBM FEDERAL SYSTEMS DIV., MANASSAS, VA.
Electrical characterization of 64K dynamic rams
[AD-A113190] N82-28556
IBM WATSON RESEARCH CENTER, YORKTOWN HEIGHTS, N.Y.
Study of the physics of insulating films as related to the reliability of metal oxide semiconductor (MOS) devices
[AD-A112501] N82-29201
IDAHO NATIONAL ENGINEERING LAB., IDAHO FALLS.
Zeta potential study of the water treatment of geothermal brines
[DE82-005910] N82-28849
IIT RESEARCH INST., ROME, N.Y.
Establishment of the Data and Analysis Center for Software (DACS)
[AD-A113262] N82-29045
ILLINOIS STATE WATER SURVEY, CHAMPAIGN.
Sampling frequency for water quality monitoring
[PB82-145343] N82-28770
Verification of the potential yield and chemical quality of the allow dolomite aquifer in DuPage County, Illinois
[PB82-158361] N82-28779
ILLINOIS UNIV. AT URBANA-CHAMPAIGN, URBANA.
Properties of three-dimensional energetic solids and molecular crystals
[AD-A113764] N82-29205
ILLINOIS UNIV., CHICAGO.
Multi-sample cluster analysis with varying parameters using Alkaike's information criterion
[AD-A113422] N82-29080
ILLINOIS UNIV., URBANA-CHAMPAIGN.
NASA Adaptive Multibeam Phased Array (AMPA): An application study
[NASA-CR-169125] N82-28503
IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
Damping in structural joints N82-28473
INCOSYM, INC., WESTLAKE VILLAGE, CALIF.
Low cost development of INS sensors for expendable RPV control and navigation
[AD-A112691] N82-28291
INDIANA UNIV., BLOOMINGTON.
Reduction of spectral interferences in inductively coupled plasma-atomic emission spectrometry by selective spectral-line modulation
[AD-A112886] N82-29178
INSTITUT FRANCAIS DU PETROLE, RUEIL-MALMAISON.
Heat pump operating with a mixture of fluids
[PB82-143611] N82-28602
INSTITUT FUER ANGEWANDTE GEODAESIE, FRANKFURT AM MAIN (WEST GERMANY).
On astro-gravimetric calculation of the quasigeoids for the Federal Republic of Germany
[SER-A-92] N82-28872
INSTITUTE OF NUCLEAR PHYSICS, KRAKOW (POLAND).
Nonrelativistic gauge theories
[DE81-700397] N82-29110
INTERMETRICS, INC. CAMBRIDGE, MASS.
System architecture study of an orbital GPS user terminal
[NASA-CR-166821] N82-28501
INTERNATIONAL NICKEL CO., INC., SUFFERN, N. Y.
Process for recovering chromium and other metals from superalloy scrap
[PB82-145418] N82-28436
IRT CORP., SAN DIEGO, CALIF.
A literature survey on inverse scattering for electron density profile determination, volume 2
[AD-A113088] N82-28862

J

JAPAN ATOMIC ENERGY RESEARCH INST., TOKYO.
Program package for solving linear optimization problems. User's manual
[DE81-700125] N82-29065
Calculation of linear stability with the aid of asymptotic solutions of Orr-Sommerfeld equation. Part 1. The treatment of the linear stability problems for (alpha)R 1 containing one simple turning point; Two dimensional quasi-parallel flow: Jeffery-Hamel flow
[DE81-700130] N82-29086
MHD stability analysis code ERATO-J. User's manual of JAERI version ERATO
[DE81-700373] N82-29191
Heat removal from the simulation electrode of a high power log pulse ion source
[DE81-700008] N82-29192
Toroidal plasma MHD equilibrium code EQUCIR version 1
[DE81-700128] N82-29193
JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies. Part 1: Executive summary
[NASA-CR-169135] N82-28325
Land Mobile Satellite Service N82-28326
LMSS telecommunication network design N82-28327
MSAT design N82-28328
Mobile vehicle antenna N82-28329
Land Mobile Satellite Service (LMSS): A conceptual system design and identification of the critical technologies: Part 2: Technical report
[NASA-CR-169136] N82-28330
Introduction N82-28331
LMSS communication network design N82-28332
Satellite system design N82-28333
The ground segment N82-28334
The technology N82-28335
Cassegrain dual reflector antenna design N82-28336
Dual-shaped reflector design N82-28337
Dual polarization N82-28338
Intermodulation analysis N82-28339
Multiple beam offset antenna design processes N82-28340
Electric propulsion N82-28341
Thermochemical generation of hydrogen
[NASA-CASE-NPO-15015-1] N82-28368
Method of forming frozen spheres in a force-free drop tower
[NASA-CASE-NPO-14845-1] N82-28442
Method and apparatus for Delta K synthetic aperature radar measurement of ocean current
[NASA-CASE-NPO-15704-1] N82-28502
High power metallic halide laser
[NASA-CASE-NPO-14782-1] N82-28616

Arrangement for damping the resonance in a laser diode
[NASA-CASE-NPO-15980-1] N82-28618
Method and apparatus for transfer function simulator for testing complex systems
[NASA-CASE-NPO-15696-1] N82-28619
Improved ingot slicing machine
[NASA-CASE-NPO-15483-1] N82-28642
Proceedings of the NASA Workshop on Registration and Rectification
[NASA-CR-169133] N82-28699
Workshop rationale N82-28700
Report of subpanel on image sharpness N82-28701
Report of subpanel on feature extraction N82-28702
Report of subpanel on inter-image matching N82-28703
Report on the subpanel on remapping procedures N82-28704
Report of the subpanel on resampling functions N82-28705
Report of the Subpanel on Error Characterization and Error Budgets N82-28706
Report of the subpanel on methods of verification N82-28707
Needs for registration and rectification of satellite imagery for land use and land cover and hydrologic applications N82-28709
Oceanographic satellite remote sensing: Registration, rectification, and data integration requirements N82-28712
Geometric and rediametric distortion in spaceborne SAR imagery N82-28717
Computational aspects of remapping digital imagery N82-28727
Data vs. information: A system paradigm N82-28732
Modeling misregistration and related effects on multispectral classification N82-28733
Conept for a multiple resolution pushbroom sensor N82-28735
Attitude tracker N82-28736
A case for inherent geometric and geodetic accuracy in remotely sensed VNIR and SWIR imaging products N82-28737
A concept for a future ground control data set for image correction N82-28738
Method of Fabricating Schottky Barrier solar cell
[NASA-CASE-NPO-13689-4] N82-28780
Wind and solar powered turbine
[NASA-CASE-NPO-15496-1] N82-28784
Solar concentrator protective system
[NASA-CASE-NPO-15662-1] N82-28785
Conversion of hydrocarbons for fuel cell applications. Part 1: Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids. Part 2: Steam reforming of n-hexane on pellet and monolithic catalyst beds
[NASA-CR-169134] N82-28787
Autothermal reforming of sulfur-free and sulfur-containing hydrocarbon liquids N82-28788
Steam reforming of n-hexane on pellet and monolithic catalyst beds. A comparative study on improvements due to heat transfer N82-28789
Requirements for the conceptual design of advanced underground coal extraction systems
[NASA-CR-169142] N82-28790
Acoustic particle separation
[NASA-CASE-NPO-15559-1] N82-29112

JOHNS-MANVILLE SALES CORP., DENVER, COLO.
Effect of outside combustion air on gas furnace efficiency
[AD-A113484] N82-28377

JOINT INST. FOR NUCLEAR RESEARCH, DUBNA (USSR).
Schroedinger equation in the quantim field theory with nonlocal
[JINR-E2-80-705] N82-29214

JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
USSR report. Space biology and aerospace medicine, volume 16, no. 3, May - June 1982
[JPRS-81197] N82-28949
Problem of accelerations in aviation medicine N82-28950
Sleep, circadian cycles of physiological functions and parameters of human work capacity on first day after changing from altered to usual sleep-waking cycle N82-28951
Role of hormonal compounds in regulation of electrolyte metabolism in the presence of emotional stress N82-28952
Metabolic distinctions related to intake of low-calorie 'survival' rations consisting only of readily assimilated carbohydrates N82-28953
Dynamics of left ventricular systolic phase structure during long-term (140-185 days) spaceflights N82-28954
Slow waves of cardiac rhythm in healthy man under different conditions N82-28955
Synchronization of cardiovascular accidents with physical clocks N82-28956
Regulation of cerebral circulation in erect position N82-28957
Endurance of +Gz G forces by middle-aged people before and after 7-day immersion N82-28958
Human external respiration and gas exchange in acute period of adaptation to immersion in water N82-28959
Reaction to diminished circulating blood volume in individuals who are susceptible and insusceptible to motion sickness (seasickness) N82-28960
Efficacy of kavinton in prevention of motion sickness N82-28961
Nystagmometry of optovestibular interaction N82-28962
Effect of caloric stimulation of vestibular system on hearing N82-28963
Possible impairment of respiratory regulation under hyperbaric nitrogen narcosis N82-28964
Mitotic activity and volume of epithelial cell nuclei of rat cornea following spaceflights in biosatellites N82-28965
Catecholamines and enzymes of their metabolism in rat myocardium after flight aboard the Cosmos-936 biosatellite N82-28966
Nitrogen compound levels in tissues of rat cerebral hemispheres and cerebellum after flight aboard Cosmos-1129 biosatellite N82-28967
Measurement of charge and energy spectra of heavy nuclei aboard Cosmos-936 artificial Earth satellite N82-28968
Condition of rats connective tissue during long-term hypokinesia and in recovery period N82-28969
Osteoporosis in unsupported extremities N82-28970
Preparation of labyrinthectomied animals for flight aboard Cosmos-936 biosatellite N82-28971
Methodological aspects of testing erythrocyte balance by counting incubated reticulocytes N82-28972
Modification of method for assaying ozone by the diacetyl dihydrolutidine reaction N82-28973
Effects of low-intensity electromagnetic fields on human and animal erythrocytes N82-28974
Effect of high ambient temperature on carbohydrate metabolism in rat liver and skeletal muscles N82-28975
Vibration and assessment of this flight factor by pilots N82-28976
USSR report. Life sciences biomedical and behavioral sciences, no. 16
[JPRS-80789] N82-28977
Microorganisms used to monitor environmental pollution N82-28978
Monograph on new direction of chemistry and biology of peptide and protein bioregulators reviewed N82-28979
Cultivation of insects as new branch of entomology - industrial entomology N82-28980
Orienting and exploratory behavior of gray rat in open field. Zoopsychological analysis N82-28981
Microelectronic electrode probe for testing brain electrical activity N82-28982
Natural and social determination of human psyche N82-28983

K

KATHOLIEKE UNIVERSITEIT TE LEUVEN (BELGIUM).
Complete statistical ranking of populations, with tables and applications
[AD-A114400] N82-29098

KIGRE, INC., TOLEDO, OHIO.
Fluorescent glasses for use in fluorescently pumping Nd-3(+) doped laser glass
[AD-A107503] N82-28620
The development of a high average power glass laser source
[AD-A107527] N82-28621

KIRKWOOD (A. C.) AND ASSOCIATES, KANSAS CITY, MO.
Survey of diesel generation by small US utilities
[DE82-901291] N82-28798

L

LETTERMAN ARMY INST. OF RESEARCH, SAN FRANCISCO, CALIF.
Domestic swine in physiological research. 3: Blood gas and acid-base values of arterial and venous blood from young anesthetized pigs maintained under steady-state ventilatory conditions
[AD-A111834] N82-28945
Long-term and progressive changes in Rhesus spectral sensitivity after low-level coherent light (514nm exposure)
[AD-A111639] N82-28946

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Maximum likelihood spectral estimation and its application of narrowband speech coding
[AD-A114070] N82-28513
Dielectric lens antenna for EHF airborne satellite communication terminals
[AD-A113250] N82-28515
A 20 GHz circularly polarized, fan beam slot array antenna
[AD-A114291] N82-28525
Acoustooptic time-integrating correlators and optoelectronic mixers
[AD-A114149] N82-28548
Application, sizing, testing and performance of the photovoltaic battery subsystem at Natural Bridges National Monument, Utah
[DE82-007040] N82-28832
Solid state research
[AD-A114189] N82-29209

LINKABIT CORP., SAN DIEGO, CALIF.
A simulation system for validating the analytical prediction of performance of the convolutional encoded and symbol interleaved TDRSS S-band return link service in a pulsed RFI environment
[NASA-CR-170428] N82-28500

LIQUID FUELS TRUST BOARD, WELLINGTON (NEW ZEALAND).
Feasibility of electric vehicles in New Zealand. Appendices
[DE82-901431] N82-29236

LITEK INTERNATIONAL, INC., HAYWARD, CALIF.
Electrodeless fluorescent lamp
[DE82-005147] N82-28564

LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.
Nutrition and food technology for a Controlled Ecological Life Support System (CELSS)
[NASA-CR-167392] N82-29004

LITTON SYSTEMS, INC., MORRIS PLAINS, N. J.
Preparation of rare earth doped YAG laser materials
[AD-A113608] N82-28623

LOCKHEED-CALIFORNIA CO., BURBANK.
Electronic/electric technology benefits study
[NASA-CR-165890] N82-28243

LOCKHEED-GEORGIA CO., MARIETTA.
Evaluation and handbook data of 7050 rivets, volume 1
[AD-A113380] N82-28415

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004179] N82-28388
Catalytic coal conversion support: Use of laser flash-pyrolysis for structural analysis
[DE82-004180] N82-28390
Catalytic coal conversion support: Use of laser flash pyrolysis for structural analysis
[DE82-004176] N82-28391
VNAP2: A computer program for computation of two-dimensional, time-dependent, compressible, turbulent flow
[NASA-CR-169103] N82-28596
Digital sequential solid-state relay tester
[DE82-004680] N82-28610

Environmental and radiological safety studies. Interaction of Pu-23802 heat sources with terrestrial and aquatic environments
[DE82-004681] N82-28848
Weighting factors in the DOE-2 computer program
[DE81-028593] N82-29057
Bicycle 2: A computer code for calculating levelized life-cycle costs
[DE82-001865] N82-29058
EOSMOD: A subroutine package for calculating equations of state and opacities
[DE82-004676] N82-29059
Some new multivariate distributions with enhanced comparisons via contour and three dimensional plots
[LA-8903-MS] N82-29071
High-order terms in sensitivity analysis through a differential approach
[LA-8813-MS] N82-29072
Injection space charge: Enlargements of flux density functioning point choice
[DE82-002299] N82-29131
Thermal properties of metallic sodium near melt from molecular dynamics calculations
[DE81-030307] N82-29132
Saturn 2: Joint project of the CEA and the IN2P3: Detection measurement electrode
[DE82-003204] N82-29133
Compton effect in the SPS: Its application in beam profile measurement
[DE82-002534] N82-29136
Photoneutron generation with electron undulators
[DE82-007034] N82-29142
Inertial fusion program
[DE82-007361] N82-29189

LOUISIANA STATE UNIV., BATON ROUGE.
Infrared transmittance of marine atmospheres
[AD-A114414] N82-29164

LOVELACE BIOMEDICAL AND ENVIRONMENTAL RESEARCH INST., ALBUQUERQUE, N. MEX.
The biological effects of repeated blasts
[AD-A113113] N82-28990

M

MARYLAND UNIV., BALTIMORE.
Testosterone enhances C-14 2-deoxyglucose uptake by striated muscle
[NASA-CR-169101] N82-28986
Detection, estimation, and control on group manifolds
[AD-A113019] N82-29107

MARYLAND UNIV., COLLEGE PARK.
Quasi-square hole with optimum shape in an infinite plate subjected in in-plane loading. Optimization of inner and outer boundaries of beams and plates with holes
[AD-A114370] N82-28679

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
The cost of noise reduction for departure and arrival operations of commercial tilt rotor aircraft
[NASA-CR-137803] N82-28281
An SCF-X alpha-SW molecular-orbital study of a possible reaction path for Ziegler-Natta catalysts
[AD-A113559] N82-28373
Monte Carlo calculations of two-dimensional combustor flows
[AD-A113760] N82-28374
Reduction of carbon monoxide. Past research summary
[DE82-007524] N82-28405
Influences of gaseous environment on low growth-rate fatigue crack propagation in steels
[DE82-005134] N82-28423
Enhancement of the stability of common polymeric materials against undersea degradation
[PB82-163015] N82-28458
A class of efficient contention resolution algorithms for multiple access channels
[AD-A113840] N82-28512
Conversion of algorithms to custom integrated circuit devices
[AD-A113822] N82-28553
Advanced electronic technology
[AD-A114319] N82-28563
Measurement methods for fluid shear stress
[AD-A113020] N82-28582
Sinterable powders from laser driven reactions
[AD-A114062] N82-28628
Evaluation of engineering foods for closed Ecological Life Support System (CELSS)
[NASA-CR-167626] N82-29003
Evaluation of engineering foods for Controlled Ecological Life Support Systems (CELSS)
[NASA-CR-166359] N82-29006
Optimixing synchronous systems
[AD-A113916] N82-29015
Discrete control of continuous processes
[AD-A113839] N82-29070
Tokamaks with high-performance resistive magnets: Advanced test reactors and prospects for commercial applications
[DE82-007366] N82-29188

MATERIALS QUALITY ASSURANCE DIRECTORATE, LONDON (ENGLAND).
A survey of some recent developments in laser Raman spectroscopy
[MQAD-TP-797] N82-28617

MATERIALS RESEARCH LAB., INC., GLENWOOD, ILL.
Effect of defects in aluminum P/M
[AD-A113134] N82-28416

MATERIALS RESEARCH LABS., ASCOT VALE (AUSTRALIA).
Percentage frequency distributions of temperature and humidity for Australia (1963-77)
[AD-A113664] N82-28885

MATERIALS RESEARCH LABS., MELBOURNE (AUSTRALIA).
A semi-analytical model for laser-induced ablation of fibre resin composites
[MRL-R-844] N82-28354

MATERIALS SCIENCES CORP., SPRING HOUSE, PA.
Research study to define the critical failure mechanisms in notched composites under compression fatigue loading
[AD-A113654] N82-28356
Elevated temperature behavior of metal-matrix composites
[AD-A113128] N82-28359

MATHEMATICAL SCIENCES NORTHWEST, INC., BELLEVUE, WASH.
Attenuation of large amplitude pressure disturbances by liquid droplets
[AD-A114250] N82-28636

MAX-PLANCK-INSTITUT FUER PHYSIK UND ASTROPHYSIK, GARCHING (WEST GERMANY).
Comptonization of photons in compact cosmic X-ray sources
[MPI-PAE/EXTRATERR-171] N82-29171
Activities report of the Institute for Extraterrestrial Physics
[MPI-PAE/EXTRATERR-172] N82-29245

MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).
Experimental investigation of the circulation and the propagation of macroscopic ring vortices in He 2
[MPIS-16/1981] N82-28598
Steady and unsteady transonic flow in a duct with a sudden enlargement
[MPIS-1/1982] N82-28599
Some comments on the prediction of forward flight effects on jet noise
[MPIS-20/1981] N82-29118

MCDONNELL AIRCRAFT CO., ST. LOUIS, MO.
Advanced trending analysis/EDS data program
[AD-A113511] N82-28286

MCELROY (RALPH) CO., AUSTIN, TEX.
Injection space charge: Enlargements of flux density functioning point choice
[DE82-002299] N82-29131
Compton effect in the SPS: Its application in beam profile measurement
[DE82-002534] N82-29136

MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
Evaluation of requirements for militarization of 3 kW free piston Stirling engine generator sets
[AD-A113409] N82-28648
Automotive Stirling engine development program
[NASA-CR-167907] N82-29235

MEDICAL BIOLOGICAL LAB. RVO-TNO, RIJSWIJK (NETHERLANDS).
The consequences of hydrazine exposition and its treatment
[MBL-1981-2] N82-28996

MERIDIAN CORP., FALLS CHURCH, VA.
Preliminary analysis of technical risk and cost uncertainty in selected DARPA programs
[AD-A107402] N82-29218

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
Future communication satellite systems and technology trends
[MBB-UB-542-81-O] N82-28322
Carbon fiber reinforced composite structures protected with metal surfaces against lightning strike damage
[MBB-UD-340-82-O/E] N82-28364
Development of materials and manufacturing technology over the next 20 years: Composite materials
[MBB-UD-341-82-O] N82-28365
Galvanically precipitated aluminum: A new material
[MBB-515-82-O] N82-28431
State of the art and development of nonmetallic materials: Glass, ceramic, graphite
[MBB-509-O] N82-28457
Cost effective communication with the electronic, microprocessor-controlled SPC telephone system EMS
[MBB-512-82-O] N82-28536
More ease in communication
[MBB-513-82-O] N82-28537
The influence of the working fluid on a turbine and Rankine cycle design efficiency
[MBB-UR-535-82-O] N82-28652
Development and construction of separator rods for the double circular guide system (DCS): Circular guide radii R1=0.05/0.75 mm; R2=0.04/0.025 mm
[MBB-UR-534-82-O] N82-29154
The Transrapid test system in Emsland
[MBB-543/81-O] N82-29237

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS, D. C.
An evaluation of strategies to control noise from air conditioning and refrigeration condensing units
[PB82-165903] N82-28496

MICHIGAN UNIV., ANN ARBOR.
Properties of organic matrix short fiber composites
[AD-A113606] N82-28358
Microwave circuit analysis and synthesis
[AD-A113560] N82-28554
Properties of three-dimensional energetic solids and molecular crystals
[AD-A113764] N82-29205

MID-AMERICAN SOLAR ENERGY COMPLEX, MINNEAPOLIS, MINN.
Passive-solar construction handbook
[DE82-002455] N82-28483
Economic analysis of small wind-energy-conversion systems for ten MASEC sites
[DE82-003976] N82-28815
Economic summary of woody biomass direct combustion and gasification alternatives
[DE82-003140] N82-28816
Summary of the Northstar home: An extension of the Solar 80 Program
[DE82-004688] N82-28817

MIDWEST RESEARCH INST., GOLDEN, COLO.
Electrical characterization of silicon produced by electrochemical purification
[DE82-005105] N82-28398
Alcohol Fuels Program Technical Review, summer, 1981
[DE82-006904] N82-28474
Measurement and use of the plasma current waveform in an RF silane discharge
[DE82-005119] N82-28566
Thermal and economic analysis of solar-assisted heat pumps for low-temperature IPH applications
[DE82-006185] N82-28805
Advanced solar energy research program
[DE82-004791] N82-28813
Evaluation of thick-file inks for solar cell grid metallization
[DE82-005615] N82-28814
Atmospheric effects on solar-cell calibration and evaluation
[DE82-007370] N82-28825

MINNESOTA UNIV., MINNEAPOLIS.
Studies in chemical reactivity
[DE82-006891] N82-28407

Experimental study of the thermodynamics of thin films and surfaces
[DE82-004887] N82-29215

MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
Mathematical models of water yield with particular reference to Mississippi watersheds. Mathematical modeling of watershed yield
[PN82-157868] N82-28772

MISSOURI UNIV., ROLLA.
Viscous effect on airfoils for unsteady transonic flows
[NASA-CR-166335] N82-28251

MITRE CORP., BEDFORD, MASS.
Multipath analysis of telemetry support positions for APATS
[AD-A114057] N82-28342

MOBIL RESEARCH AND DEVELOPMENT CORP., PRINCETON, N. J.
Fundamental studies in the conversion of coals to fuels of increased hydrogen content. Volume 1: The chemistry and mechanisms of coal conversion to clean fuel
[DE82-901287] N82-28472

MONSANTO RESEARCH CORP., MIAMISBURG, OHIO.
In-situ coal gasification of bituminous coals. A development plan
[DE82-002558] N82-28471

MONTANA WATER RESOURCES RESEARCH CENTER, BOZEMAN.
Snow barrier potential for harvesting moisture in transects across Chinook areas in Montana
[PB82-157926] N82-28771

MURRAY-NORTH PARTNERS LTD., HAMILTON (NEW ZEALAND).
Small hydro-electric resource assessment: Hauraki area
[DE82-901428] N82-28757

N

NAGOYA UNIV. (JAPAN).
Feedback control of thermal runaway with compression-decompression
[IPPJ-573] N82-29175

NAPLES UNIV. (ITALY).
Effect of applied stress, thermal environment and water in epoxy resins
[AD-A113016] N82-28450

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Model of direct initiation of unconfined detonations
[AD-A107446] N82-28508
Report of Ad Hoc NDAB subgroup
[AD-A112955] N82-29227

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Third test flight of shuttle (STS-3)
[NASA-EB-82-4] N82-28323
Earth Resources: A continuing bibliography with indexes, issue 33
[NASA-SP-7041(33)] N82-28695
MLA imaging systems N82-28716
Capturing energy from the wind
[NASA-SP-455] N82-28783
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 232)
[NASA-SP-7011(232)] N82-28984
Aerospace Medicine and Biology: A continuing bibliography with indexes, supplement 233, June 1982
[NASA-SP-7011(233)] N82-28985
NASA report to educators, volume 10, no. 1 N82-29216

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
Aerodynamic interactions between a 1/6 scale helicopter rotor and a body of revolution
[NASA-TM-84247] N82-28252
Static noise tests on modified augmentor wing jet STOL research aircraft
[NASA-TM-81231] N82-28295
Preparation of perfluorinated 1,2,4-oxadiazoles
[NASA-CASE-ARC-11267-2] N82-28353
The high temperature thermochemical properties of carbon
[NASA-TM-84710] N82-28380
Method for the preparation of thin-skinned asymmetric reverse osmosis membranes and products thereof
[NASA-CASE-ARC-11359-1] N82-28444
Numerical simulation of wall-bounded turbulent shear flows
[NASA-TM-84259] N82-28577
BRDF measurements of sunshield and baffle materials for the IRAS telescope
[NASA-TM-84235] N82-29155

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Data registration and integration requirements for severe storms research N82-28711
Scanner imaging systems, aircraft N82-28715
Spacecraft induced error sources N82-28718
User's guide for the Total-Ozone Mapping Spectrometer (TOMS) instrument first year ozone T data set
[NASA-RP-1096] N82-28880
FORTRAN static source code analyzer (SAP) user's guide
[NASA-TM-84786] N82-29021
System description of the IMP-16C microprocessor orbit determination program
[NASA-TM-84802] N82-29023
LANDSAT/NAVPAK system description and user's guide
[NASA-TM-84782] N82-29024
Intel 8080 orbit propagation program system description and user's guide
[NASA-TM-84783] N82-29025
Evaluation of the IMP-16 microprocessor orbit determination system filter
[NASA-TM-84788] N82-29026
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) MODCOMP device and MAX 4 dependency study
[NASA-TM-84796] N82-29027
Orbit determination software development for microprocessor based systems: Evaluation and recommendations
[NASA-TM-84794] N82-29028
The two-way TDRSS observation model for the LSI-11/23 microcomputer
[NASA-TM-84793] N82-29029
Automated Orbit Determination System (AODS) requirements definition and analysis
[NASA-TM-84795] N82-29030
Algorithms for autonomous star identification
[NASA-TM-84789] N82-29031
Systems Technology Laboratory (STL) library methods and procedures
[NASA-TM-84787] N82-29032
Mathematical specifications of the Onboard Navigation Package (ONPAC) simulator (revision 1)
[NASA-TM-84797] N82-29033
Systems Technology Laboratory (STL) compendium of utilities
[NASA-TM-84799] N82-29034
Automated Orbit Determination System (AODS) environment simulator for prototype testing (ADEPT) system description
[NASA-TM-84801] N82-29035
Preliminary Automated Orbit Determination System (AODS)/AODS environment simulator for prototype testing (ADEPT) user's guide
[NASA-TM-84798] N82-29036
GPSPAC/LANDSAT-D Interface (GLI) system description
[NASA-TM-84803] N82-29037
GPSPAC/LANDSAT-D Interface (GLI) system user's guide
[NASA-TM-84784] N82-29038
System description for the Global Positioning Subsystem Experiment Package (GPSPAC) Experiment Data Preprocessor (GEDAP)
[NASA-TM-84785] N82-29039
Structured FORTRAN preprocessor (SFORT) PDP-11/70 user's guide
[NASA-TM-84790] N82-29040
FORTRAN static source code analyzer program (SAP) user's guide, revision 1
[NASA-TM-84791] N82-29041
Multimission Modular Spacecraft Ground Support Software System (MMS/GSSS) state-of-the-art computer systems/ compatibility study
[NASA-TM-84792] N82-29042
Automated collection of software engineering data in the Software Engineering Laboratory (SEL)
[NASA-TM-84766] N82-29043
Autonomous onboard attitude determination system specifications and requirements
[NASA-TM-84800] N82-29056

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Apparatus for releasably connecting first and second objects in predetermined space relationship
[NASA-CASE-MSC-18969-1] N82-28318
Inter-image matching N82-28725
Geometric verification N82-28730
Thermal garment
[NASA-CASE-XMS-03694-1] N82-29002
Reconfiguring redundancy management
[NASA-CASE-MSC-18498-1] N82-29013

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. JOHN F. KENNEDY SPACE CENTER, COCOA BEACH, FLA.
Misregistration's effects on classification and proportion estimation accuracy N82-28731

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Influence of surface static-pressure orifices on boundary-layer transition
[NASA-TM-84492] N82-28248
Flight evaluation of LORAN-C in the State of Vermont
[NASA-TM-84711] N82-28278
Means for controlling aerodynamically induced twist
[NASA-CASE-LAR-12175-1] N82-28279
Design considerations and experiences in the use of composite material for an aeroelastic research wing
[NASA-TM-83291] N82-28280
Methodology for determining elevon deflections to trim and maneuver the DAST vehicle with negative static margin
[NASA-TM-84499] N82-28299
Preliminary sizing of vibration absorber for space mast structures
[NASA-TM-84488] N82-28346
Hermetically sealable package for hybrid solid-state electronic devices and the like
[NASA-CASE-MSC-20181-1] N82-28549
Preliminary analysis of STS-3 entry heat-transfer data for orbiter windward centerline
[NASA-TM-84500] N82-28575
Apparatus and process for microbial detection and enumeration
[NASA-CASE-LAR-12709-1] N82-28604
Spray applicator for spraying coatings and other fluids in space
[NASA-CASE-MSC-18852-1] N82-28640
Slow opening valve
[NASA-CASE-MSC-20112-1] N82-28641
Buckling test of a 3-meter-diameter corrugated graphite-epoxy ring-stiffened cylinder
[NASA-TP-2032] N82-28665
Simplified free-energy calculation for ion-induced heteromolecular nucleation
[NASA-TP-2039] N82-28839
Scientific and technical information output of the Langley Research Center for Calender year 1981
[NASA-TM-83270] N82-29225

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Computer program for calculating full potential transonic, quasi-three-dimensional flow through a rotating turbomachinery blade row
[NASA-TP-2030] N82-28247
A summary of V/STOL inlet analysis methods
[NASA-TM-82885] N82-28249
Comparison of laser anemometer measurements and theory in an annular turbine cascade with experimental accuracy determined by parameter estimation
[NASA-TM-82860] N82-28250
Texturing polymer surfaces by transfer casting
[NASA-CASE-LEW-13120-1] N82-28440
Method of protecting a surface with a silicon-slurry/aluminide coating
[NASA-CASE-LEW-13343-1] N82-28441
Ion beam sputter deposited diamond like films
[NASA-TM-82873] N82-28445

Effect of hydrocarbon fuel type on fuel
[NASA-TM-82916] N82-28460
The dryout region in frictionally heated sliding contacts
[NASA-TM-82796] N82-28574
Laser anemometer using a Fabry-Perot interferometer for measuring mean velocity and turbulence intensity along the optical axis in turbomachinery
[NASA-TM-82841] N82-28605
Reliability model for planetary gear
[NASA-TM-82859] N82-28643
Advances in high-speed rolling-element bearings
[NASA-TM-82910] N82-28644
The optimal design of involute gear teeth with unequal addenda
[NASA-TM-82866] N82-28645
A finite element stress analysis of spur gears including fillet radii and rim thickness effects
[NASA-TM-82865] N82-28646
Rolling resistance of electric vehicle tires from track tests
[NASA-TM-82836] N82-28786
Acceleration of convergence of vector sequences
[NASA-TM-82931] N82-29075

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Terrestrial environment (climatic) criteria guidelines for use in aerospace vehicle development
[NASA-TM-82473] N82-28317
Photoelectric detection system
[NASA-CASE-MFS-23776-1] N82-28545
A dc to dc converter
[NASA-CASE-MFS-25430-1] N82-28550
A bivariate gamma probability distribution with application to gust modeling
[NASA-TM-82483] N82-29094

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.

Thermochemical generation of hydrogen
[NASA-CASE-NPO-15015-1] N82-28368
Method of forming frozen spheres in a force-free drop tower
[NASA-CASE-NPO-14845-1] N82-28442
Method and apparatus for Delta K synthetic aperature radar measurement of ocean current
[NASA-CASE-NPO-15704-1] N82-28502
High power metallic halide laser
[NASA-CASE-NPO-14782-1] N82-28616
Arrangement for damping the resonance in a laser diode
[NASA-CASE-NPO-15980-1] N82-28618
Method and apparatus for transfer function simulator for testing complex systems
[NASA-CASE-NPO-15696-1] N82-28619
Improved ingot slicing machine
[NASA-CASE-NPO-15483-1] N82-28642
Method of Fabricating Schottky Barrier solar cell
[NASA-CASE-NPO-13689-4] N82-28780
Wind and solar powered turbine
[NASA-CASE-NPO-15496-1] N82-28784
Solar concentrator protective system
[NASA-CASE-NPO-15662-1] N82-28785
Acoustic particle separation
[NASA-CASE-NPO-15559-1] N82-29112

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WALLOPS FLIGHT CENTER, WALLOPS ISLAND, VA.

A Fourier transform spectrometer for visible and near ultra-violet measurements of atmospheric absorption
[NASA-TM-73297] N82-28606
Baseline monitoring using aircraft laser ranging
[NASA-TM-73298] N82-28690

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).

Evaluation of an experimental technique to investigate the effects of the engine position on engine/pylon/wing interference
[NLR-MP-81020-U] N82-28262
A finite difference method for the calculation of transonic flow about a wing, based on small perturbation theory
[NLR-TR-81031-U] N82-28263
Improved 243 MHz homing antenna system for use on helicopters
[NLR-MP-81022-U] N82-28276
The determination of gust loads on nonlinear aircraft using a power spectral density approach
[NLR-TR-80123-U] N82-28303
Investigation of corrosion and microstructural properties of high strength aluminum alloys after Jominy testing
[NLR-MP-81004-U] N82-28432
The influence of different types of anodic layers on the fatigue properties of 2024-T3 and 7075-T6 sheet material
[NLR-TR-80077-U] N82-28433
The Jominy end-quench test for investigation of corrosion properties and microstructure of high strength aluminum alloys
[NLR-TR-80102-U] N82-28434
Prediction of fatigue crack growth rates under variable loading using a simple crack closure model
[NLR-MP-81023-U] N82-28685
Stress corrosion crack initiation testing of high strength aluminum alloys using tuning fork type specimens
[NLR-TR-81053-U] N82-28686
Feasibility of B spline data reduction on remote sensing data
[NLR-TR-80023-U] N82-28767
Calculation procedure for sound propagation in a multisectional duct with uniform flow
[NLR-TR-79111-U] N82-29119
Calculation of sound suppression in a circular three-sectioned uniform flow duct
[NLR-TR-81002-U] N82-29120

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.

Earth Terminal Measurement System maintenance manual, addendum
[PB82-151994] N82-28544

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.

Octanol/water partition coefficients and aqueous solubilities of organic compounds
[PB82-141797] N82-28408
Application of solidification theory to rapid solidification processing
[AD-A112864] N82-28411
Analysis of data from the energy monitoring and control system at the Norris Cotton Federal Office Building
[PB82-138744] N82-28491
NBS/ESDS: A computer model for the simulation of hot water systems
[PB82-139361] N82-28492
Fundamental developments for quantitative acoustic emission measurements
[DE82-901315] N82-29114
Dimensions/NBS, volume 65, number 7, September 1981
[PB82-158692] N82-29230

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.

A method for the circulation of invariant manifolds in hydrodynamic stability problems
[PB82-158825] N82-28603
One-and two dimensional photochemical modeling of the chemical interactions in the middle atmosphere (0-120 km)
[PB82-156613] N82-28874
The effects of moisture on mountain lee waves
[PB82-156621] N82-28920
LRIR observations of the structure and propagation of the stationary planetary waves in the Northern Hemisphere during December 1975
[PB82-156639] N82-28921
Summer MONEX US research flight missions, May - July 1979
[PB82-158718] N82-28923
Boundary subroutine for the NCAR global climate model
[PB82-158742] N82-28924
Circulation statics for the extratropical Northern Hemisphere based on NMC analyses
[PB82-158759] N82-28925
Case studies on convective storms, case study 10, 22 July 1975: Mature storm study: A conceptual model synthesized from microphysical and dynamic observations of a multicell thunderstorm
[PB82-159567] N82-28928
Winter MONEX US research flight missions, December 1978
[PB82-158767] N82-28929

NATIONAL COAL BOARD, LEATHERHEAD (ENGLAND).

In-bed corrosion tests of superheater alloys in a 10-square-foot AFBC
[DE82-901346] N82-28427

NATIONAL GEODETIC SURVEY, ROCKVILLE, MD.

Precise determination of the disturbing potential using alternative boundary values
[PB82-150392] N82-28875

NATIONAL INST. FOR AERONAUTICS AND SYSTEMS TECHNOLOGY, PRETORIA (SOUTH AFRICA).

Proceedings of the Conference on Finite Element Methods in South Africa N82-28671

NATIONAL INST. FOR METALLURGY, RANDBURG (SOUTH AFRICA).

The organizing of conferences
[PB82-142696] N82-28948

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.

The frequency shift of a pulse by a time-independent, dispersive, lossy medium
[PB82-161977] N82-28542
Bending of a Ray in a random inhomogeneous medium
[PB82-148966] N82-28543
Optical and in situ measuring of structure parameters relevant to temperature and humidity and their application to the measuring of sensible and latent heat flux
[AD-A114336] N82-28637
Frequency response measurements on Lyman-alpha humidiometers
[AD-A113240] N82-28905
FACE-2 data reductions and analyses, prior to disclosure of the treatment decisions. Part 1: FACE-2 rain gage rainfall
[PB82-163056] N82-28926

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.

Geodetic control N82-28720

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.

Vertical sections of temperature, salinity, thermosteric anomaly and zonal geostrophic velocity from NORPAX shuttle experiment, part 1
[PB82-163106] N82-28944

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.

Environmental satellite imagery, July 1981
[PN82-156894] N82-28922

NATIONAL PHYSICAL LAB., TEDDINGTON (ENGLAND).

The effect of heat transfer on the diffusion-limited cathodic reduction of oxygen on steel in flowing 3.2 percent sodium chloride solution
[NPL-DMA(A)-38] N82-28410
The design of cams for creep testing at constant stress
[NPL-DMA(B)-23] N82-28668

NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA (ONTARIO).

Evaluations of helicopter instrument-flight handling qualities
[AD-A114004] N82-28285
Quantitative thermal description spectrometry of ionically implanted inert gases. 1: Fundamental aspects N82-28370
Quantitative thermal desorption spectrometry of ionically implanted inert gases. 2: Technical requirements N82-28371

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.

S-band radar pulse densities in the Los Angeles area
[AD-A114116] N82-28529
Electromagnetic wave trajectories at VHF and higher frequencies
[PB82-134289] N82-28538

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.

Special investigation report: Air traffic control system
[PB82-136276] N82-28277

NATIONAL WEATHER SERVICE, SILVER SPRING, MD.

Operations of the National Weather Service
[PB82-161829] N82-28927

NAVAL AEROSPACE MEDICAL INST., PENSACOLA, FLA.
A procedure for the analysis of nystagmus and other eye movements
[AD-A112603] N82-28987
NAVAL AEROSPACE MEDICAL RESEARCH LAB., PENSACOLA, FLA.
Determining visual acuity thresholds: A simulation study of stimulus presentation strategies
[AD-A111821] N82-28992
NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
Simulation of the motion of the center of mass of an occupant under ejection accelerations
[AD-A113806] N82-28989
NAVAL BIODYNAMICS LAB., NEW ORLEANS, LA.
Task analysis and the ability requirements of tasks: Collected papers
[AD-A111181] N82-29000
Biomechanical analysis of tasks involving manual materials handling
[AD-A113955] N82-29009
NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY, BAY ST. LOUIS, MISS.
Analog data compression for Versatile Experimental Kevlar Array (VEKA) telemetry
[AD-A114324] N82-28343
Ocean current effects on marine seismic systems and deployments
[AD-A114135] N82-28934
Ocean altimetry algorithms status: March 1982
[AD-A114325] N82-28935
Surface stress estimation for study of the circulation dynamics of the Gulf of Mexico
[AD-A114349] N82-28936
Measurements of whitecap coverage and surface winds over the Gulf of Mexico loop current
[AD-A114429] N82-28937
Geology related to acoustic transmission: Eastern Caribbean
[AD-A114430] N82-28938
NAVAL OCEANOGRAPHIC OFFICE, BAY ST. LOUIS, MISS.
Environmental files and data bases. Part A: Introduction and oceanographic management information system
[AD-A113687] N82-29226
NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Airborne laser turret flow control: A parametric study of wind tunnel model conditions
[AD-A113557] N82-28255
The influence of solution treatment time and quench rate on microstructure and mechanical properties of high magnesium aluminum magnesium alloys
[AD-A113826] N82-28413
A study of the breakdown mechanism of AISI 304 stainless steel, type 2024 aluminum and various titanium coatings
[AD-A113831] N82-28414
Entrainment modelling of buoyant momentum jets in water
[AD-A112797] N82-28580
Power spectra of geomagnetic fluctuations between 0.02 and 20 Hz
[AD-A113848] N82-28861
Statistical post-processing of the Navy nested tropical cyclone model and the operational tropical cyclone model
[AD-A114150] N82-28911
Software maintenance: Improvement through better development standards and documentation
[AD-A113257] N82-29047
Software Engineering Principles
[AD-A113415] N82-29048
Finite birth-and-death models in randomly changing environments
[AD-A114188] N82-29102
Variability and sensitivity of coupled mixed layer acoustic model systems
[AD-A114302] N82-29123
NAVAL RESEARCH LAB., WASHINGTON, D. C.
Gas-solid reactions. Part 1: External diffusion-controlled reactions
[AD-A114086] N82-28387
On microstructural control of near threshold fatigue crack growth in 7000 series aluminum alloys
[AD-A113486] N82-28417
High-resolution radar sea scatter, experimental observations and discriminants
[AD-A113394] N82-28520
Acoustic instabilities as a source of turbulence in reduced density channels
[AD-A114275] N82-28592
Stress anlaysis of two mini-hat pressure gage designs
[AD-A112186] N82-28607
Equipment and tracking test results for the NRL ship-to-ship DF laser transmission experiment
[AD-A113485] N82-28631
The 2-D nonlinear theory of the free electron laser amplifier for an electron beam with finite axial and transverse dimensions
[AD-A114220] N82-28638
Internal heat deposition in laser highly accelerated targets
[AD-A114206] N82-28639
Non-destructive evaluation of defects in structural materials using long-wavelength neutrons
[AD-A113500] N82-28656
The electron avalanche ionization of air and a simple air chemistry model
[AD-A113501] N82-28864
Preliminary results of line sensor test
[AD-A114313] N82-28939
An intelligent control strategy for computer consultation
[AD-A113388] N82-29016
Software Engineering Principles
[AD-A113415] N82-29048
Numerical simulations of magneto-hydrodynamic chemically reactive flows in three-dimensions on a vector computer
[AD-A113487] N82-29049
Drift resistive interchange and tearing modes in cylindrical geometry
[AD-A113499] N82-29179
Spot spectroscopy: Local spectroscopic measurements within laser produced plasmas
[AD-A114165] N82-29180
Structuring caused by Rayleigh-Taylor instability
[AD-A114085] N82-29181
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.
Performance predictions for a room temperature, Ericsson cycle, magnetic heat pump
[AD-A114348] N82-28593
NAVAL SUBMARINE MEDICAL RESEARCH LAB., GROTON, CONN.
Cold weather goggles. 2: Performance evaluation
[AD-A114067] N82-29008
NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA.
Experimental time-domain determination of complex resonances of simple objects
[AD-A113168] N82-28521
An experimental computer algorithm for seamount model parameter estimation based on SEASAT-A satellite radar altimetry
[AD-A113169] N82-28743
INPUTP (general purpose input processor). User guide
[AD-A114257] N82-29055
NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
Investigations on the nature and reactivity of compounds formed between lithium and carbon black
[AD-A113116] N82-28378
Electrochemistry of sulfur dioxide in nonaqueous solutions, part 1
[AD-A113033] N82-28379
The influence of a background plasma on the diocotron instability of a relativistic hollow electron beam
[AD-A113530] N82-29127
Stability of charged beam propagation through a relativistic hollow electron beam
[AD-A113529] N82-29128
NAVAL TRAINING EQUIPMENT CENTER, ORLANDO, FLA.
Computer program for analysis of spherical screen distortion
[AD-A113136] N82-28309
NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
Fitting a polynomial to data in the presence of noise
[AD-A112984] N82-29081
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER, SAN DIEGO, CALIF.
On models and methods for performance measurement
[AD-A113578] N82-28998
Empirical comparison of binary and continuous proximity measures for clustering occupational task data
[AD-A112930] N82-29097
NEW HAMPSHIRE UNIV., DURHAM.
Study of a wind energy conversion system in New Hampshire
[AD-A114418] N82-28795
NEW MEXICO UNIV., ALBUQUERQUE.
Small sample properties of robust analysis of variance for fixed and random effects models
[AD-A113877] N82-29095
NEW YORK UNIV., N. Y.
Geochemical and geophysical models of the fossile-fuel CO2 climate problem
[DE82-005484] N82-28917
Charge transfer spectra and photoelectron emission by solutions
[AD-A114054] N82-29126
Study of photoexcited states by positron method
[DE82-005469] N82-29143
NEW ZEALAND ENERGY RESEARCH AND DEVELOPMENT COMMITTEE, AUCKLAND.
Small hydro-electric resource assessment: Hauraki area
[DE82-901428] N82-28757
Standard weather data for New Zealand
[DE82-901427] N82-28912
Feasibility of electric vehicles in New Zealand. Appendices
[DE82-901431] N82-29236
NOVA UNIV., FORT LAUDERDALE, FLA.
Scientific opportunities using satellite wind stress measurements over the ocean
[NASA-CR-169100] N82-28879

O

OAK RIDGE GASEOUS DIFFUSION PLANT, TENN.
Hydrogeochemical and stream sediment reconnaissance basic data for Sheridan quadrangle, Wyoming
[DE82-002467] N82-28748
Hydrogeochemical and stream sediment reconnaissance basic data for Ophir, Alaska
[DE82-000851] N82-28753
Hydrogeochemical and stream sediment reconnaissance basic data for Cheyenne quadrangle, Wyoming
[DE82-000786] N82-28754
Hydrogeochemical and stream sediment reconnaissance basic data for Preston quadrangle, Wyoming; Idaho
[DE82-000783] N82-28755
Hydrogeochemical and stream sediment reconnaissance basic data for Tularosa quadrangle, New Mexico
[DE82-000787] N82-28756
Hydrogeochemical and stream sediment reconnaissance basic data for Aztec Qaudrangle, New Mexico
[DE82-000853] N82-28760
Hydrogeochemical and stream sediment reconnaissance basic data for Silver City quadrangle, New Mexico; Arizona
[DE82-000852] N82-28761
Hydrogeochemical and stream sediment reconnaissance basic data for Brownfield quadrangle, New Mexico; Texas
[DE82-000855] N82-28762
Hydrogeochemical and stream sediment reconnaissance basic data for Dallas NTMS quadrangle, Texas
[DE82-000856] N82-28763
OAK RIDGE NATIONAL LAB., TENN.
Thermal analysis of SYNROC gel microspheres
[DE82-003472] N82-28399

Recent progress in major coal liquefaction facilities: Overview Report No. 2
[DE82-004656] N82-28400
Performance assessment of materials and components of the Westinghouse coal gasification process development unit
[DE82-005995] N82-28401
Evaluation of potential processes for recovery of metals from coal ash. Volume 2: Laboratory data and cost estimates
[DE82-005592] N82-28428
Acquisition and performance evaluation of a quadrupole mass spectrometer in a mobile laboratory
[DE82-004668] N82-28611
Least squares adjustment of large-scale geodetic networks by orthogonal decomposition
[DE82-002253] N82-28758
Evaluation of nonelectrical energy-transmission options
[DE82-000886] N82-28821
Fossil energy program
[DE82-005947] N82-28824
Ecological implications of air pollutants from synthetic-fuels processing
[DE82-002792] N82-28844
Potential costs of complying with emission regulations for an indirect coal-liquefaction process
[DE82-001471] N82-28845
What is ALARA
[DE81-030814] N82-28995
Computer-generated speech
[DE82-004672] N82-29063
Comparison of some methods for solving sparse linear least squares problems
[DE82-004651] N82-29084
Plasma assessments for the Fusion Engineering Device (FED)
[DE82-004649] N82-29184

OAK RIDGE Y-12 PLANT, TENN.
Comparison of laser welds in two stainless steels
[DE82-004699] N82-28651
Miniature interferometer transducer: An optical system description and cost analysis
[DE82-004653] N82-29168
Initial stages of oxidation on single crystals of lithium hydride interaction between single crystal lithium hydride and a stainless steel, high vacuum container
[DE82-005614] N82-29212

OCEAN DATA SYSTEMS, INC., ROCKVILLE, MD.
Computer support to NORDA codes 520 and 530
[AD-A114371] N82-29052

OFFICE OF NAVAL RESEARCH, LONDON (ENGLAND).
European scientific notes, volume 36, no. 3
[AD-A114255] N82-29260

OHIO STATE UNIV., COLUMBUS.
Lifetimes and production properties of charmed particles
[DE82-005302] N82-29140

OKLAHOMA STATE UNIV., STILLWATER.
Seismic analysis of rotating mechanical systems. A review N82-28479
Study of boundary-layer transition using transonic cone Preston tube data
[NASA-CR-169130] N82-28579

OLD DOMINION UNIV., NORFOLK, VA.
Improved finite element methodology for integrated thermal structural analysis
[NASA-CR-169126] N82-28666

OREGON GRADUATE CENTER FOR STUDY AND RESEARCH, BEAVERTON.
Rare earth boride electron emitter materials fabrication and evaluation
[AD-A113807] N82-29203

OREGON STATE UNIV., CORVALLIS.
Elastomechanical methods in the exploration of the Valles Caldera, New Mexico
[DE82-006923] N82-28766

P

PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Technical and economic assessment of fluidized-bed-augmented compressed-air energy-storage system. Volume 1: Executive summary
[DE82-001894] N82-28822
Impact of a proposed change in the maximum permissible dose limit for neutrons to radiation-protection programs at DOE facilities
[DE82-001419] N82-29137

PACIFIC-SIERRA RESEARCH CORP., SANTA MONICA, CALIF.
A numerical method for using a ray tracing program to compute radio fields in regions of strong focusing
[AD-A113913] N82-28509

PANAMETRICS, INC., WALTHAM, MASS.
Design, fabrication, calibration, testing and satellite integration of a space radiation dosimeter
[AD-A113085] N82-28348
Theoretical investigation of absorptive processes
[AD-A107278] N82-28507

PARIS XI UNIV., ORSAY (FRANCE).
Search for superconductivity in ion-implanted b-Ge films
[IPNO-PHN-80-22] N82-29211

PAYNE, INC., ANNAPOLIS, MD.
Underwater power source study
[AD-A112644] N82-28792

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Characterization of solids and surfaces using ion beams and mass spectrometry
[AD-A112904] N82-28376
Use of metallurgical variables and surface properties to control hydrogen embrittlement
[AD-A114190] N82-28420
An experimental study of travelling-bubble cavitation noise
[AD-A114107] N82-28587
Adapative motivation theory
[AD-A111195] N82-28997

PENNSYLVANIA UNIV., PHILADELPHIA.
Silver-doping effects and photostructural transformation in evaporated As2S3 thin films
[AD-A113148] N82-28375

PENNWALT CORP., KING OF PRUSSIA, PA.
Pelletization and roll encapsulation of phase-change materials
[DE82-000162] N82-28389

PHOTOMETRICS, INC., WOBURN, MASS.
Identification of requirements for atmospheric data
[AD-A113640] N82-28886

PHYSICAL SCIENCES, INC., WOBURN, MASS.
Study of turbulent boundary layers over rough surfaces with emphasis on the effects of roughness character and Mach number
[AD-A114217] N82-28588

PITTSBURG ENERGY TECHNOLOGY CENTER, PA.
Analysis of Dense-Phase Fine-Coal Pneumatic Systems
[DE82-010243] N82-28759

PITTSBURG UNIV., PA.
Multivariate analysis and its applications
[AD-A113027] N82-29077

POLYTECHNIC INST. OF BUCHAREST (RUMANIA).
Analysis of measured structural frequency response data N82-28675

POLYTECHNIC INST. OF NEW YORK, BROOKLYN.
The 10th IFIP Conference on System Modeling and Optimization
[AD-A113126] N82-29104

POLYTECHNIC INST. OF NEW YORK, FARMINGDALE.
Calculation of three-dimensional, inviscid supersonic, steady flows
[NASA-CR-3573] N82-28246

PORTLAND CEMENT ASSOCIATION, SKOKIE, ILL.
Coupled walls in earthquake-resistant building: Parametric investigation and design procedure
[PB82-147901] N82-28487
Structural walls in earthquake-resistant buildings: Dynamic analysis of isolated structural walls. Development of design procedure: Design force levels
[PB82-147794] N82-28488

PRATT AND WHITNEY AIRCRAFT GROUP, EAST HARTFORD, CONN.
B747/JT9D flight loads and their effect on engine running clearances and performance deterioration; BCAC NAIL/P and WA JT9D engine diagnostics programs
[NASA-CR-165573] N82-28296

PRINCETON UNIV., N. J.
Coupling of transport and chemical processes in catalytic combustion
[DE82-006267] N82-28403
Secondary electron yields of carbon-coated and polished stainless steel
[DE82-012762] N82-28426
Automated torsion pendulum: Control and data collection/reduction using a desktop computer
[AD-A113038] N82-28670
Robust comparison of three-dimensional shapes with an application to protein molecule configurations
[AD-A113736] N82-29050
Pre-configural polysampling pushback performance
[AD-A114304] N82-29099
Studies in energetic material dynamics
[AD-A114226] N82-29129

PUERTO RICO UNIV., MAYAGUEZ.
OTEC biofouling, corrosion, and materials study from a moored platform at Punta Tuna, Puerto Rico
[DE82-007037] N82-28947

PURDUE UNIV., LAFAYETTE, IND.
Effects of cobalt on the microstructure of Udimet 700
[NASA-CR-165605] N82-28409
Super hydrides
[AD-A113229] N82-28449
Wall layer structure and drag reduction: Role of vicous sublayer
[AD-A112980] N82-28581
A discussion of image sharpness N82-28723
Photogrammetric aspects of remapping procedures N82-28726
Current status of metric reduction of (passive) scanner data N82-28739
Development of a methodology for assessing aircrew workloads
[AD-A114364] N82-29010

Q

QEB, INC., LAKEWOOD, COLO.
Airborne gamma-ray spectrometer and magnetometer survey: Crescent quadrangle, Burns quadrangle, Canyon City quadrangle, Bend quadrangle, Salem quadrangle (Oregon)
[DE81-029063] N82-28749

R

RADIO TECHNICAL COMMISSION FOR AERONAUTICS, WASHINGTON, D. C.
Minimum operational performance standards for automatic direction finding (ADF) equipment
[RTCA/DO-179] N82-28270

RAND CORP., SANTA MONICA, CALIF.
A Rand note: Policy analysis of water management for the Netherlands. Volume 3: Screening of eutrophication control tactics
[RAND/N-1500/3-NETH] N82-28691
A Rand note: Policy analysis of water management for the Netherlands. Volume 16: Costs for infrastructure tactics
[RAND/N-1500/16-NETH] N82-28692
A Rand note: Policy analysis of water management for the Netherlands. Volume 17: Flood safety model for the Ijssel Lakes
[RAND/N-1500/17-NETH] N82-28693
A Rand note: Policy analysis of water management for the Netherlands. Volume 18: Sedimentation and dredging cost models
[RAND/N-1500/18-NETH] N82-28694
The effects of lease size on yields from oil shale surface mines
[RAND/N-1798-DOE] N82-28697
Projected engineering cost estimates for an Ocean Thermal Energy Conversion (OTEC)
[RAND/N-1788-RC] N82-28782
Technical options for reducing chlorofluorocarbon emissions
[RAND-R-2879-EPA] N82-28840
Future computing
[RAND/P-6680] N82-29020
Are robustness measures robust
[RAND/P-6734] N82-29073
Monitoring technologies for ocean disposal of radioactive waste
[RAND/R-2773-NOAA] N82-29146
PLANNERS' WORKBENCH: A computer aid to the re-planning
[AD-A113331] N82-29219

Implementation of information technology in office settings: Review of relevant literature
[RAND-P-6697] N82-29224

RANGE COMMANDERS COUNCIL, WHITE SANDS MISSILE RANGE, N. MEX.
Unguided rocket safety: An informal compendium of range techniques for assuring safety in rocket testing
[AD-A113765] N82-28315

Flight termination system equipment. Volume 1: Antennas and antenna couplers
[AD-A113493] N82-28320

RAYTHEON CO., BEDFORD, MASS.
Technical guidelines for LSI hybrid microcircuits
[AD-A114437] N82-28562

RESEARCH INST. OF NATIONAL DEFENCE, LINKOEPING (SWEDEN).
Sensor technology
[FOA-C-30262-E1] N82-28613

OTT: A computer aided ground wave model for the VHF range in hilly terrain with varying ground characteristics
[FOA-C-30265-E2] N82-29088

RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).
Fine scale structures in time and space of rainfall rate
[FOA-C-20448-E2] N82-28919

RESEARCH TRIANGLE INST., RESEARCH TRIANGLE PARK, N. C.
Problems related to the integration of fault tolerant aircraft electronic systems
[NASA-CR-165926] N82-29022

RICE UNIV., HOUSTON, TEX.
Modeling of high-latitude currents in a substorm
[AD-A114311] N82-28865

ROCHESTER UNIV., N. Y.
Laser-generated electron emission from surfaces: Effect of the pulse shape on temperature and transient phenomena
[AD-A114282] N82-28633

Modeling temperature data: An illustration of the use of biplots and bimodels in nonlinear modeling
[AD-A114169] N82-28907

BGRAPH: A program for biplot multivariate graphics. Version 1: User's guide
[AD-A114449] N82-29051

ROCKWELL INTERNATIONAL CORP., ANAHEIM, CALIF.
Hermetically sealable package for hybrid solid-state electronic devices and the like
[NASA-CASE-MSC-20181-1] N82-28549

ROCKWELL INTERNATIONAL CORP., CANOGA PARK, CALIF.
Inorganic halogen oxidizer research
[AD-A114196] N82-28382

ROCKWELL INTERNATIONAL CORP., CEDAR RAPIDS, IOWA.
Delta electrical load analysis C-141B JACC/CP aircraft
[AD-A113761] N82-28283

ROCKWELL INTERNATIONAL CORP., DOWNEY, CALIF.
Testing of a high capacity research heat pipe
[NASA-CR-167625] N82-28578

ROCKWELL INTERNATIONAL CORP., RICHLAND, WASH.
Long-term high-level defense waste technology
[DE82-005755] N82-29151

ROSE ENGINEERING AND RESEARCH, INC., INCLINE VILLAGE, NEV.
Nearfield aerodynamics and optical propagation characteristics of a large-scale turret model
[AD-A113910] N82-28624

ROYAL AIR FORCE INST. OF AVIATION MEDICINE, FARNBOROUGH (ENGLAND).
A procedure for the analysis of nystagmus and other eye movements
[AD-A112603] N82-28987

ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
The attached flow over a slender delta wing with leading-edge flaps
[RAE-TR-81150] N82-28254

The use of terrain height information for improving the accuracy of classification of LANDSAT data
[RAE-TM-SPACE-297] N82-28696

ROYAL INST. OF TECH., STOCKHOLM (SWEDEN).
A numerical method for analytic continuation of conformal mappings
[TRITA-NA-8118] N82-29089

Some computational aspects of the boundary collocation method for linear partial differential equations and related questions
[TRITA-NA-8119] N82-29090

Error propagation in stiff differential systems of singular perturbation type
[TRITA-NA-8108] N82-29091

Multiple step G-contractivity with applications to slowly varying linear systems
[TRITA-NA-8107] N82-29092

On the contractivity region of Runge-Kutta methods
[TRITA-NA-8106] N82-29093

An inexpensive 15 MHz fiber optic analog data link
[TRITA-PFU-82-05] N82-29172

The radial variation of the ionization in a coaxial plasma gun operated under critical velocity conditions
[TRITA-EPP-81-07] N82-29195

ROYAL SIGNALS AND RADAR ESTABLISHMENT, MALVERN (ENGLAND).
Buried insulated antennas
[RSRE-MEMO-3418] N82-28497

A broadband waveguide transfer standard for the dissemination of UK national microwave power standards
[RSRE-MEMO-3390] N82-28498

A true logarithmic IF frequency amplifier for radar applications
[RSRE-MEMO-3400] N82-28504

High speed SAW spectrum analyser data handling
[RSRE-MEMO-3450] N82-28546

An atmospheric refractive index fluctuation meter
[RSRE-MEMO-3433] N82-28856

ADA on multiple processors
[RSRE-MEMO-3464] N82-29019

The influence of the temperature coefficient of refractive index on a thermal imager
[RSRE-MEMO-3398] N82-29156

S

SANDIA LABS., ALBUQUERQUE, N. MEX.
Portable random number generator for use in signal processing
[DE82-006831] N82-28532

Sourcebook on high-temperature electronics and instrumentation
[DE82-006197] N82-28567

Stability of a 100-kV self-firing spark gap
[DE82-005718] N82-28570

Multi-frac test series
[DE82-004514] N82-28680

Applied stress determination using computerized ultrasonic techniques
[DE82-003894] N82-28681

Intermediate photovoltaic system application experiment operational performance report. Volume 3: Mt. Laguna Radar Station, Mt. Laguna, California
[DE82-003006] N82-28809

Design handbook for photovoltaic power systems. Volume 1: Simplified methods for utility interconnected systems
[DE82-003108] N82-28810

Design studies for concentrating photovoltaic arrays
[DE82-005113] N82-28812

Lithium oxide in the Li(Si)/FeS2 thermal battery system
[DE82-005114] N82-28818

Development of a RELAP model for the Barstow thermal-storage subsystem
[DE82-006828] N82-28819

Economic analysis based on land costs of collector spacing in a collector field
[DE82-004519] N82-28820

Photovoltaics and electric utilities
[DE82-006994] N82-28833

Intermediate photovoltaic system application experiment operational performance report. Volume 4: Mt. Laguna Radar Station, Mt. Laguna, Calif.
[DE82-007565] N82-28835

Intermediate photovoltaic system application experiment operational performance report. Volume 5: Newman Power Station Site, El Paso, Tex.
[DE82-007566] N82-28836

Gas-driven fracture propagation
[DE82-003079] N82-28870

FORTRAN 4 program for calculating X-ray powder diffraction patterns version 9/10
[DE82-003893] N82-29062

PARSER: A tool for command interpretation
[DE82-006829] N82-29064

Inverse of a Laplace transform and its numerical evaluation
[DE82-004667] N82-29085

Particle-beam fusion
[DE82-002900] N82-29183

Realistic approach to the planning of high technology, high risk projects
[DE82-001049] N82-29223

SANTA BARBARA RESEARCH CENTER, GOLETA, CALIF.
Thematic mapper performance N82-28714

SARGENT AND LUNDY, ENGINEERS, CHICAGO, ILL.
Non-US advanced low-level radwaste treatment systems
[DE82-900852] N82-29148

SCHAFER (W. J.) ASSOCIATES, INC., WAKEFIELD, MASS.
Low voltage free electron laser optics
[AD-A113659] N82-28625

SCIENCE APPLICATIONS, INC., ATLANTA, GA.
Analysis of a rail gun plasma accelerator
[AD-A114043] N82-29125

SCIENCE APPLICATIONS, INC., MCLEAN, VA.
Design handbook for photovoltaic power systems. Volume 1: Simplified methods for utility interconnected systems
[DE82-003108] N82-28810

Radiation from high temperature plasmas
[AD-A113597] N82-29177

SCIENCE RESEARCH COUNCIL, CHILTON (ENGLAND).
The first three years of IUE
[RL-81-091] N82-29242

SCIENTIFIC RESEARCH ASSOCIATES, INC., GLASTONBURY, CONN.
Computation of turbulent horseshoe vortex flow past swept and unswept leading edges
[AD-A113534] N82-28584

Computation of laminar and turbulent flow in 90 deg square duct and pipe bends using the Navier-Stokes equations
[AD-A114258] N82-28589

SCIENTIFIC TRANSLATION SERVICE, SANTA BARBARA, CALIF.
Thermo-optical properties of optical glasses
[DE82-003681] N82-29169

SEVILLE RESEARCH CORP., PENSACOLA, FLA.
Operational test and evaluation handbook for aircrew training devices. Volume 2: Operational effectiveness evaluation
[AD-A112570] N82-28305

Operational test and evaluation handbook for aircrew training devices. Volume 3: Operational suitability evaluation
[AD-A112569] N82-28306

SHOCK AND VIBRATION INFORMATION CENTER (DEFENSE), WASHINGTON, D. C.
The Shock and Vibration Digest, volume 14, no. 6
[AD-A115750] N82-28476

The shock and vibration digest, volume 14, no. 5
[AD-A115091] N82-28659

The shock and vibration digest, volume 14, no. 4
[AD-A114448] N82-28673

SIGNATRON, INC., LEXINGTON, MASS.
Nonlinear system identification technique validation
[AD-A112593] N82-28505

SINGER CO., FAIRFIELD, N. J.
New sensor concepts: Low cost vibrating beam accelerometer
[AD-A113644] N82-28272

SKF INDUSTRIES, INC., KING OF PRUSSIA, PA.
High fracture toughness bearing development
[AD-A113582] N82-28647

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASS.
Definition phase effort of the Spacelab-2 Infrared Telescope Experiment (IRT)
[NASA-CR-170424] N82-29243
SOLAR TURBINES INTERNATIONAL, SAN DIEGO, CALIF.
Erosion mechanisms of metals
[AD-A111537] N82-28418
SONICRAFT, INC., CHICAGO, ILL.
Atmospheric transmittance/radiance computer code FASCOD2
[AD-A113825] N82-28859
SOUTHAMPTON UNIV. (ENGLAND).
Streamlining the walls of an empty two-dimensional flexible-walled test section
[NASA-CR-165936] N82-28304
SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION, INC., ST. CLOUD, FLA.
United States Air Force Summer Faculty Research Program. 1981 Program Management report
[AD-A113707] N82-29259
SOUTHERN METHODIST UNIV., DALLAS, TEX.
Bias reduction
[AD-A114254] N82-29100
SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Emission characterization of an alcohol/diesel-pilot fueled compression ignition engine and its heavy-duty diesel counterpart
[PB82-154113] N82-28654
The changing dimensions of qualification testing N82-28674
SPERRY RESEARCH CENTER, SUDBURY, MASS.
Design and fabrication of multimode optical switches
[AD-A113812] N82-29159
SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
Basic study of fuel storage stability
[AD-A114127] N82-28466
Impact of advanced power semiconductor systems on utilities and industry
[DE82-901286] N82-28547
STANFORD LINEAR ACCELERATOR CENTER, CALIF.
Virtual memory management
[DE82-000908] N82-29061
STANFORD UNIV., CALIF.
A general method to determine the stability of compressible flows
[NASA-CR-169129] N82-28572
Innovative measurement technology for the semiconductor device industry based on electron spectroscopy
[PB82-135922] N82-28615
Virtual memory management
[SU-SLAC-244] N82-29014
The last whole errata catalog
[AD-A112929] N82-29044
On the power output of some idealized source configurations with one or more characteristic dimensions
[NASA-CR-169132] N82-29074
Pilot-1980 energy-economic model. Volume 1: Model description
[DE82-901280] N82-29106
The effect of barriers on wave propagation phenomena: With application for aircraft noise shielding
[NASA-CR-169128] N82-29111
Separability as a physical database design methodology
[AD-A114138] N82-29228
STATE UNIV. OF NEW YORK, BINGHAMTON.
Optimal alpha-beta filtering for tracking reentry vehicles from shipboard radars
[AD-A113076] N82-28314
STATENS PROVNINGSANSTALT, BORAAS (SWEDEN).
Fire extinguishing tests -80 with methyl alcohol gasoline
[SP-RAPP-1981:20] N82-28485
Hydraulic tests of tanks for dangerous goods
[SP-RAPP-1982:01] N82-28683
Test methods for plastic windows
[SP-A-82:02] N82-28684
STOCKHOLM UNIV. (SWEDEN).
The annual variation of the large-scale 500 mb and sea level pressure fields
[DM-35] N82-28918
Rotational analysis of the red system of C-13N-14. Part 2: Wave numbers, term values and constants
[USIP-81-11] N82-29258
STRATEGIC AIR COMMAND, OFFUTT AFB, NEBR.
Alert aircraft roll over chocks
[AD-A107456] N82-28307
STUTTGART UNIV. (WEST GERMANY).
Investigation of the long term behavior of heat pipes
[IKE-5-215] N82-28597
Production of liquid fuels out of plant biomass and refuse: Methods, cost, potential
[IKE-K-68] N82-28838
Confinement and magnetoacoustic heating of a low density belt pinch plasma
[IPF-81-8] N82-29196
Ion emission characteristics of plasma focus devices
[IPF-81-9] N82-29197
Ion motion in the plasma focus
[IPF-81-11] N82-29198
First 50 pulse per sec Thomson scattering diagnostics in a Tokamak
[IPF-81-13] N82-29199
SUNTECH, INC., MARCUS HOOK, PA.
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 1: Preliminary process analyses
[AD-A112681] N82-28462
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 2: Process variable analyses and laboratory sample production
[AD-A112682] N82-28463
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 3: Production of specification of JP-4 fuel from geokinetics shale oil
[AD-A112683] N82-28464
SVERDRUP TECHNOLOGY, INC., ARNOLD AIR FORCE STATION, TENN.
High resolution spectral absorption in the short wavelength wing of the 2.7-micrometer water band at 1,000 K
[AD-A114156] N82-28383
SYSTEMS AND APPLIED SCIENCES CORP., HAMPTON, VA.
Finite-difference solution of the compressible stability eignevalue problem
[NASA-CR-3584] N82-28573
SYSTEMS AND APPLIED SCIENCES CORP., RIVERDALE, MD.
Estimating the tops, bases, and amount of cloudiness from in situ sampling
[AD-A113107] N82-28904
SYSTEMS CONSULTANTS, INC., WASHINGTON, D. C.
Energy and solid/hazardous waste
[DE82-006964] N82-29152
SYSTEMS RESEARCH LABS., INC., DAYTON, OHIO.
Wind-tunnel evaluation of an aeroelastically conformable rotor
[AD-A114384] N82-28260
SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF.
Space Shuttle flying qualities and flight control system assessment study
[NASA-CR-170391] N82-28300

T

TAMPERE UNIV. TECHNOLOGY (FINLAND).
Studies of the dynamic and mechanical properties of thermoplastics by the split Hopkinson pressure bar method
[PH-130] N82-28443
TECHNICAL UNIV. OF DENMARK, LYNGBY.
Current topics in rotordynamics research N82-28477
TECHNISCHE HOCHSCHULE, DARMSTADT (WEST GERMANY).
Development of a surface technology for GaAs devices
[AD-A112913] N82-29206
TECHNISCHE HOGESCHOOL, DELFT (NETHERLANDS).
Quantitative thermal desorption spectrometry of noble gases in solids N82-28369
TECHNISCHE PHYSISCHE DIENST TNO-TH, DELFT (NETHERLANDS).
Preliminary study of the possibilities for the use of glass fibers in hydrophones
[TPD-1981-0-2(105.106)] N82-29115
Use of the cavitation tunnel at the Dutch Naval Experiment station (NSP), Wageningen for the determination of the acoustic source strength of propeller cavitation
[TPD-908-720] N82-29116
Measurement of sound power flow in bending waves along pipes. Part 2: Influence of a near field on measurements with two accelerometers
[TPD-008-785/1] N82-29117
TECHNISCHE UNIVERSITAET, BRUNSWICK (WEST GERMANY).
Classification of data sets
[BMVG-FBWT-80-17] N82-29103
TECHNISCHE UNIVERSITAET, MUNICH (WEST GERMANY).
Rockets and astronautics. (Lexicon contribution)
[TUM-LRT-TB-81/11] N82-28352
Deposition of highly active nuclear wastes
[TUM-LRT-TB-81/3] N82-29153
Production of a fast high density plasma flow
[TUM-LRT-TB-81/14] N82-29194
Future satellite carriers
[TUM-LRT-TB-81/6] N82-29248
Sticking of comet dust to target surfaces
[TUM-LRT-TB-81/1] N82-29252
Comet dust collection
[TUM-LRT-TB-81/13] N82-29253
TENNESSEE TECHNOLOGICAL UNIV., COOKEVILLE.
Fatigue design of machine elements N82-28660
TENNESSEE UNIV. SPACE INST., TULLAHOMA.
Analysis of vibration induced error in turbulence velocity measurements from an aircraft wing tip boom
[NASA-CR-3571] N82-28881
TENNESSEE VALLEY AUTHORITY, MUSCLE SHOALS, ALA.
Economics of spray-dryer FGD system: The two-stage open-loop processes
[DE82-900158] N82-28846
TEXAS TECHNOLOGICAL UNIV., LUBBOCK.
Nonparametric estimation of signals mixed with noise
[AD-A113018] N82-28514
TEXAS TRANSPORTATION INST., COLLEGE STATION.
Traffic capacity through work zones on urban freeways
[PB82-143009] N82-29239
Sight distance requirements at lane closure work zones on urban freeways
[PB82-142290] N82-29240
TEXAS UNIV., AUSTIN.
Ambient noise in the western Gulf of Mexico
[AD-A114126] N82-28931
Aircraft and crew scheduling during airlift operations
[AD-A114114] N82-29011
Unconstrained minimization by interpolation: Rates of convergence
[AD-A114115] N82-29082
The best parameter subset using the Chebychev curve fitting criterion
[AD-A114327] N82-29083
Khincin-Kullback-Leibler estimation with inequality constraints
[AD-A114326] N82-29101
Handling artificial variables in a simplex method. A commentary
[AD-A114133] N82-29105
THIOKOL CORP., BRIGHAM CITY, UTAH.
Polycyclic high energy oxidizers
[AD-A112585] N82-28446
TRW DEFENSE AND SPACE SYSTEMS GROUP, REDONDO BEACH, CALIF.
Multifunction multiband airborne radio architecture study
[AD-A114427] N82-28523
RF plasma sources for neutral-beam-injection systems. Phase 1: Definition study
[DE82-004193] N82-29182
TRW, INC., REDONDO BEACH, CALIF.
Analytical modeling of spacecraft power systems
[NASA-CR-166820] N82-28349

TUFTS UNIV., MEDFORD, MASS.
Pointing payload for single tether balloons and other projects
[AD-A114447] N82-28259

U

UNITED AIRCRAFT CORP., EAST HARTFORD, CONN.
Thermal garment
[NASA-CASE-XMS-03694-1] N82-29002
UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.
Electron-beam sustained mercuric bromide laser study
[AD-A114246] N82-28634
Technical and econmic assessment of fluidized-bed-augmented compressed-air energy-storage system. Volume 1: Executive summary
[DE82-001894] N82-28822
UNIVERSAL ENERGY SYSTEMS, INC., DAYTON, OHIO.
An optimal design of simple symmetric laminates under the first ply failure criteria
[AD-A113689] N82-28357
UNIVERSAL TECHNOLOGY CORP., DAYTON, OHIO.
Properties of organic matrix short fiber composites
[AD-A113606] N82-28358
UNIVERSITIES SPACE RESEARCH ASSOCIATION, COLUMBIA, MD.
Fast generation of three-dimensional computational boundary-conforming periodic grids of C-type
[NASA-CR-165596] N82-28253

V

VARIAN ASSOCIATES, PALO ALTO, CALIF.
Integrated balanced FETS for broadband millimeter wave amplifiers
[AD-A107526] N82-28551
VEREINIGTE FLUGTECHNISCHE WERKE G.M.B.H., BREMEN (WEST GERMANY).
Advanced casting: Today and tomorrow
N82-28486
VILLANOVA UNIV., PA.
Gust response of commerical jet aircraft including effects of autopilot operation
[NASA-CR-165919] N82-28266
VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Damage development mechanisms in notched graphite epoxy composite laminates during compressive fatigue loading
[PB82-142316] N82-28367
Quality control and nondestructive evaluation techniques for composites. Part 7: Thermography: A state-of-the-art review
[AD-A114392] N82-28657
The digital step edge N82-28724
Rule-based programming for human-computer interface specification
[AD-A113036] N82-29007
VIRGINIA UNIV., CHARLOTTESVILLE.
Limiting performance of nonlinear systems with applications to helicopter vibration control problems
[AD-A113239] N82-28301
VON KARMAN INST. FOR FLUID DYNAMICS, RHODE-SAINT-GENESE (BELGIUM).
An investigation of the flow about an ogive cylinder at high angles of incidence
[AD-A113356] N82-28256
An experimental and numerical study of an air-to-air heat exchanger using liquid reservoir variable conductance heat pipes
[AD-A113354] N82-28585
A numerical investigation of the dynamics of liquid spray
[AD-A113378] N82-28586
Thermal energy storage in phase change material
[AD-A113355] N82-28793

W

WASHINGTON STATE UNIV., PULLMAN.
Manganese nodule resource data, Sea Scope expedition
[PB82-142571] N82-28768
WAYNE STATE UNIV., DETROIT, MICH.
Integrated approach to the systematic synthesis, characterization, and catalytic activity of novel heterogeneous catalysts
[DE82-004898] N82-28404
WEAPONS SYSTEMS RESEARCH LAB., ADELAIDE (AUSTRALIA).
Computational aerodynamics at Weapons Systems Research Laboratory
[AD-A112867] N82-28257
The use of a deflectable nose on a missile as a control device
[AD-A112179] N82-28319
WEATHER WING (1ST), HICKAM AFB, HAWAII.
Terminal forecast reference notebook, Osan AB, Korea
[AD-A107433] N82-28882
Terminal forcast reference notebook, Camp Casey, Korea
[AD-A107432] N82-28883
WEATHER WING (5TH), LANGLEY AFB, VA.
Terminal Forecast Reference Notebook, Fresno Air Terminal, California
[AD-A107434] N82-28884
WEST VIRGINIA UNIV., MORGANTOWN.
Optimization studies of various coal conversion systems
[DE82-005208] N82-28473
WESTERN GEOPHYSICAL CO. OF AMERICA, HOUSTON, TEX.
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 1
[DE82-005544] N82-28744
Airborne gamma-ray spectrometer and magnetometer survey, Mitchell quadrangle, South Dakota, volume 2
[DE82-005572] N82-28745
Airborne gamma-ray spectrometer and magnetometer survey, New Rockford quadrangle, North Dakota
[DE82-005535] N82-28746
Airborne gamma-ray spectrometer and magnetometer survey: New Rockford quadrangle, North Dakota, Volume 2
[DE82-005569] N82-28747
Airborne gamma-ray spectrometer and magnetometer survey Coos Bay, Oregon, volume 1
[DE82-005534] N82-28750
Airborne gamma-ray spectrometer and magnetometer survey, Roseburg Quadrangle, Oregon, volume 1
[DE82-005536] N82-28765
WESTERN RESEARCH CORP., SAN DIEGO, CALIF.
Design support of a rare gas halide laser
[AD-A112464] N82-28622
WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Laboratory demonstration electromagnetic launcher: Preliminary hazard analysis
[AD-A114154] N82-28524
Charged particle simulation of fast neutron damage
[AD-A107394] N82-29124
Preparation of large-diameter GaAs crystals
[AD-A107395] N82-29202
WESTINGHOUSE RESEARCH LABS., PITTSBURGH, PA.
Advanced machinery liquid metal wetting, cleaning and materials compatibility study
[AD-A113294] N82-28480
WHITE SANDS MISSILE RANGE, N.MEX.
IRIG-Time synchronized binary video data inserter
[AD-A107119] N82-28506
WISCONSIN UNIV., MADISON.
Chemical reactions and properties of organosilicon compounds related to new materials
[AD-A114377] N82-28451
Molecular reaction rates
[AD-A114342] N82-29130
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
The 1981 summer study program in geophysical fluid dynamics at the Woods Hole Oceanographic Institution physics of convection
[AD-A114366] N82-28590
Coastal-shelf transport and diffusion
[DE82-005474] N82-28941
Radioelement studies in the oceans
[DE82-003705] N82-28942
YORK UNIV., DOWNSVIEW (ONTARIO).
The dynamics of mean circulation on the continental shelf
[PB82-157082] N82-28943
WRIGHT STATE UNIV., DAYTON, OHIO.
Flight crewmember workload evaluation
[AD-A114167] N82-29012

X

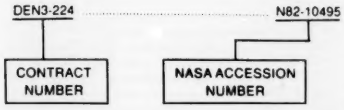
XEROX CORP., PALO ALTO, CALIF.
Structural and electronic studies of defects in amorphous silicon
[DE82-004477] N82-29213

Y

YALE UNIV., NEW HAVEN, CONN.
Properties of materials using acoustic waves
[AD-A114124] N82-29113
YORK COLL., JAMAICA, N. Y.
Fine-grained hodoscopes based on scintillating optical fibers
[DE82-006248] N82-29170
YORK UNIV., DOWNSVIEW (ONTARIO).
Sensitized photo-reduction of methyl viologen by metalloporphyrins
[AD-A114443] N82-28381

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

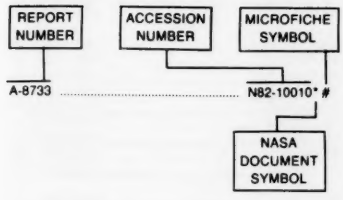
AF PROJ. C503 ..... N82-29157
AF PROJ. 317J N82-28624
AF PROJ. 411L N82-28513
AF PROJ. 649L N82-28563
N82-29209
AF PROJ. 1123 ..... N82-28302
N82-28305
N82-28306
AF PROJ. 1900 ..... N82-28842
N82-28843
AF PROJ. 2002 ..... N82-28554
AF PROJ. 2003 ..... N82-28523
AF PROJ. 2029 ..... N82-28515
AF PROJ. 2283 ..... N82-28513
AF PROJ. 2300 ..... N82-28548
AF PROJ. 2301 ..... N82-28256
N82-28585
N82-28586
N82-28793
AF PROJ. 2303 ..... N82-28451
N82-28627
AF PROJ. 2304 ..... N82-28314
N82-28514
N82-28553
N82-29070
N82-29077
N82-29078
N82-29079
N82-29104
N82-29107
AF PROJ. 2305 ..... N82-29159
N82-29259
AF PROJ. 2306 ..... N82-28375
N82-28418
N82-29203
N82-29208
AF PROJ. 2307 ..... N82-28358
N82-28359
N82-28450
N82-28583
N82-28588
N82-28636
AF PROJ. 2310 ..... N82-28862
N82-29130
AF PROJ. 2311 ..... N82-28865
N82-29160
AF PROJ. 2312 ..... N82-28991
AF PROJ. 2338 ..... N82-28505
N82-28555
N82-28556
N82-28558
AF PROJ. 2418 ..... N82-28415
N82-28416
AF PROJ. 2480 ..... N82-28463
N82-28464
AF PROJ. 2505 ..... N82-28268
AF PROJ. 2528 ..... N82-29045
AF PROJ. 2688 ..... N82-28904
AF PROJ. 3048 ..... N82-28462
N82-28647
AF PROJ. 3066 ..... N82-28286
AF PROJ. 3145 ..... N82-28284
AF PROJ. 4290 ..... N82-28342
AF PROJ. 4506 ..... N82-28557
AF PROJ. 4600 ..... N82-28509
N82-28516
AF PROJ. 4643 ..... N82-28866
N82-29256
AF PROJ. 5581 ..... N82-29067
N82-29068
N82-29069
AF PROJ. 5730 ..... N82-28467
AF PROJ. 6095 ..... N82-28272
AF PROJ. 6210 ..... N82-29076
AF PROJ. 6430 ..... N82-28515
AF PROJ. 6690 ..... N82-28347
AF PROJ. 6781 ..... N82-28886
AF PROJ. 7184 ..... N82-29010
AF PROJ. 7231 ..... N82-28267
N82-28841
AF PROJ. 7601 ..... N82-28348
N82-28868
AF PROJ. 7659 ..... N82-28259
AF PROJ. 7670 ..... N82-28372
N82-28859
AF-AFOSR-120-81 ..... N82-28585
AF-AFOSR-0008-80 ..... N82-29104
AF-AFOSR-0058-81 ..... N82-28514
AF-AFOSR-0065-79 ..... N82-28678
AF-AFOSR-0075-81 ..... N82-29079
AF-AFOSR-0076-81 ..... N82-28314
AF-AFOSR-0098-81 ..... N82-28991
AF-AFOSR-0117-81 ..... N82-28586
AF-AFOSR-0118-81 ..... N82-28256
AF-AFOSR-0119-81 ..... N82-28793
AF-AFOSR-0241-80 ..... N82-29107
AF-AFOSR-3107-77 ..... N82-29208
AF-AFOSR-3369-77 ..... N82-28450
AF-AFOSR-3570-78 ..... N82-28451
AF-AFOSR-3575-78 ..... N82-28627
AF-AFOSR-3535-78 ..... N82-28609
ARO-55-81 ..... N82-28905
ARPA ORDER 2397 ..... N82-28615
ARPA ORDER 3045 ..... N82-28512
ARPA ORDER 3503 ..... N82-29157
ARPA ORDER 3655 ..... N82-29161
ARPA ORDER 3718 ..... N82-28864
ARPA ORDER 3732 ..... N82-28524
ARPA ORDER 3751 ..... N82-28411
ARPA ORDER 3808 ..... N82-28628
ARPA ORDER 3829 ..... N82-28511
ARPA ORDER 4012 ..... N82-29201
ARPA ORDER 4395 ..... N82-28592
A72/KM/007 ..... N82-29116
A76/K/098 ..... N82-28996
A76/KM/030 ..... N82-29117
A81/KM/078 ..... N82-29115
DA PROJ. 1H7-61211-AH-71 ..... N82-29054
DA PROJ. 1L1-61101-A-91A N82-29176
DA PROJ. 1L1-61102-AH-43 ..... N82-28258
DA PROJ. 1L1-62105-AH-84 ..... N82-28412
DA PROJ. 1L1-62209-AH-76 ..... N82-28261
DA PROJ. 1L1-62603-AH-18 ..... N82-29125
DA PROJ. 1L1-62617-AH-19 ..... N82-28287
DA PROJ. 1L1-62618-AH-80 ..... N82-28465
N82-28607
N82-29108
DA PROJ. 1L1-62622-A-554 ..... N82-29163
DA PROJ. 1L2-62209-AH-76 ..... N82-28260
DA PROJ. 1T1-61102-BH-57 ..... N82-29206
DA PROJ. 1T1-63102-D-071 ..... N82-28419
DA PROJ. 3E1-61102-BS-10 ..... N82-28993
DA PROJ. 3M1-61102-BS-10 ..... N82-28945
DA PROJ. 4A1-61102-AT-24 ..... N82-29204
DA PROJ. 4A7-62731-AT-41 ..... N82-28518
DAAB07-77-C-0587 ..... N82-28522
DAAE07-80-C-9113 ..... N82-28650
DAAG29-76-D-0100 ..... N82-28657
DAAG29-76-G-0109 ..... N82-28455
DAAG29-79-C-0022 ..... N82-29095
DAAG29-79-C-0027 ..... N82-28449
DAAG29-79-C-0155 ..... N82-29018
DAAG29-79-C-0205 ..... N82-29050
N82-29099
DAAG29-79-G-0015 ..... N82-28301
DAAG29-79-G-0033 ..... N82-28455
DAAG29-79-0053 ..... N82-28507
DAAG29-80-C-0059 ..... N82-28454
DAAG29-80-C-0122 ..... N82-28466
DAAG29-80-K-0071 ..... N82-28455
DAAG46-78-C-0009 ..... N82-28419
DAAH01-81-M-A138 ..... N82-28658
DAAK10-79-C-0110 ..... N82-28524
DAAK10-79-C-0134 ..... N82-28461
DAAK11-80-C-0102 ..... N82-29125
DAAK40-79-C-0150 ..... N82-28355
DAAK70-78-D-0002 ..... N82-28377
DAAK70-79-D-0097 ..... N82-29018
DAAK70-81-C-0025 ..... N82-28742
DAAR70-81-C-0115 ..... N82-28648
DAA929-81-K-0031 ..... N82-28374
DAJA37-81-M-0038 ..... N82-29206
DARPA ORDER 3833 ..... N82-29158
DARPA ORDER 4121 ..... N82-28527
DARPA ORDER 4287 ..... N82-29218
DCA100-80-C-0039 ..... N82-28510
DE-AB01-76CS-31020 ..... N82-28807
DE-AC01-79CS-30027 ..... N82-28806
N82-28808
N82-28850
DE-AC02-76CH-00016 ..... N82-28469
N82-29190
DE-AC02-76CH-03073 ..... N82-28426
DE-AC02-76ER-01545 ..... N82-29140
DE-AC02-76ET-20279 ..... N82-28832
DE-AC02-77CH-00178 ..... N82-28398
N82-28474
N82-28566
N82-28805
N82-28811
N82-28813
N82-28814
N82-28825
N82-29213
DE-AC02-78ET-51013 ..... N82-29188
DE-AC02-79CS-30150 ..... N82-28483
N82-28815
N82-28816
N82-28817
DE-AC02-79EV-10005 ..... N82-28943
DE-AC02-80ER-10556 ..... N82-28682
DE-AC02-80ER-10575 ..... N82-28830
DE-AC02-80EV-10154 ..... N82-29152
DE-AC02-81ER-10887 ..... N82-29215
DE-AC02-81ER-40035 ..... N82-29170
DE-AC02-81EV-10610 ..... N82-28917
DE-AC02-81EV-10694 ..... N82-28942
DE-AC03-76SF-00515 ..... N82-29014
N82-29061
DE-AC03-79CS-30203 ..... N82-28799
N82-28802
N82-28803
DE-AC03-81ER-52071 ..... N82-29182
DE-AC04-76DP-00053 ..... N82-28471
DE-AC04-76DP-00613 ..... N82-28316
N82-28430
DE-AC04-76DP-00789 ..... N82-28532
N82-28567
N82-28570

N82-28680
N82-28681
N82-28809
N82-28810
N82-28818
N82-28819
N82-28820
N82-28833
N82-28835
N82-28836
N82-28870
N82-29062
N82-29064
N82-29085
N82-29183
N82-29223
DE-AC04-79DP-00789 ..... N82-28812
DE-AC04-81AL-16223 ..... N82-28568
DE-AC06-76RL-01830 ..... N82-28823
N82-28827
N82-28828
N82-28829
N82-28913
N82-28914
N82-28915
N82-28916
N82-29137
N82-29138
DE-AC06-77RL-01030 ..... N82-29151
DE-AC06-176RL-01830 ..... N82-28822
DE-AC07-75ID-01570 ..... N82-28800
DE-AC07-76ID-01570 ..... N82-28849
DE-AC08-76NV-01183 ..... N82-28752
DE-AC13-76GJ-01664 ..... N82-28744
N82-28745
N82-28746
N82-28747
N82-28750
N82-28765
DE-AC13-79GH-01692 ..... N82-28749
DE-AC21-80MC-14036 ..... N82-28403
DE-AI01-76ET-12548 ..... N82-28790
DE-AI01-77CS-51044 ..... N82-28786
DE-AI03-79ET-11326-1 ..... N82-28787
DE-AI08-78ET-44802 ..... N82-28869
DE-AI08-79DP-40092 ..... N82-28639
DE-AS02-76ER-02026 ..... N82-28407
DE-AS02-76ET-53016 ..... N82-29187
DE-AS02-77EV-04500 ..... N82-29143
DE-AS02-78ER-04721 ..... N82-28402
DE-AS02-78ER-04949 ..... N82-28405
DE-AS02-79ER-10381 ..... N82-28404
DE-AS02-79ER-10389 ..... N82-28423
DE-AS02-79EV-10005 ..... N82-28941
DE-FC07-80ID-12200 ..... N82-28834
DE-FG02-81R5-10301 ..... N82-28831
DE-FG22-81PC-40778 ..... N82-28473
DEN3-32 ..... N82-29235
DFG-IG-3/4 ..... N82-29253
DI-BM-G0-284008 ..... N82-28768
DI-BM-JO-188056 ..... N82-28436
DI-14-34-0001-1126 ..... N82-28772
DI-14-34-0001-7056 ..... N82-28771
DNA IACRO 81-832 ..... N82-28990
DNA PROJ. U99-QAXMK000 ..... N82-28990
DOT-CG-635285-A N82-28271
DOT-FA76WA-3788 ..... N82-28274
DOT-FH-11-9505 ..... N82-29238
DTFA01-80-C-10030 ..... N82-28275
DTFA01-81-Y-10535 ..... N82-28529
EC-77-A-31-10040 ..... N82-29235
EG-77-C-01-4042 ..... N82-28398
N82-28566
N82-28805
N82-28813
N82-28814
N82-28825
EPA-R-804337 ..... N82-28770
EPA-68-01-3952 ..... N82-28496
EPA-68-01-5892 ..... N82-29121
N82-29122
EPA-68-01-6231 ..... N82-28640
EPA-68-03-2884 ..... N82-28654
EPA-80-X0985 ..... N82-28408
EPRI PROJ. 608-1 ..... N82-29114
EPRI PROJ. 652-1 ..... N82-29106
EPRI PROJ. 979-2 ..... N82-28427
EPRI PROJ. 1180-7 ..... N82-28646
EPRI PROJ. 1197-2 ..... N82-28647
EPRI PROJ. 1201-12 ..... N82-28547
EPRI PROJ. 1404-2 ..... N82-28428
EPRI PROJ. 1432-2 ..... N82-29222
EPRI PROJ. 1557-1 ..... N82-29148
EPRI PROJ. 1655-1 ..... N82-28472
EX-76-A-34-1006 ..... N82-29179
FMV-F-FR-84362-72-280 ..... N82-28919
F04701-80-C-0081 ..... N82-28324
F04701-81-C-0082 ..... N82-28360
N82-28380
N82-28632
N82-28635
N82-28867
N82-28244
N82-29257
F08635-80-C-0086 ..... N82-28842
N82-28843
F09603-80-C-0602 ..... N82-28283
F09603-80-G-0420 ..... N82-28655
F09603-81-C-1953 ..... N82-28283
F09628-79-C-0095 ..... N82-28347
F19623-78-C-0247 ..... N82-28348
F19628-77-C-0270 ..... N82-28866
F19628-79-C-0041 ..... N82-28372
F19628-79-C-0045 ..... N82-28130
F19628-79-C-0073 ..... N82-28886
F19628-79-C-0120 ..... N82-28859
F19628-79-C-0173 ..... N82-28516
F19628-80-C-0002 ..... N82-28513
N82-28515
N82-28525
N82-28548
N82-28563
N82-29209
F19628-80-C-0009 ..... N82-28865
F19628-80-C-0060 ..... N82-28259
F19628-80-C-0065 ..... N82-28509
F19628-80-C-0117 ..... N82-29203
F19628-80-C-0124 ..... N82-29076
F19628-80-C-0147 ..... N82-29159
F19628-80-C-0187 ..... N82-28862
F19628-81-C-0017 ..... N82-28904
F19628-81-C-0048 ..... N82-28868
F19628-82-C-0001 ..... N82-28342
F29601-79-C-0011 ..... N82-28624
F30602-78-C-0099 ..... N82-29069
F30602-78-C-0255 ..... N82-29045
F30602-78-C-00120 ..... N82-29018
F30602-79-C-0002 ..... N82-28557
F30602-79-C-0193 ..... N82-29067
N82-29068
F30602-80-C-0045 ..... N82-28558
F30602-80-C-0059 ..... N82-28555
F30602-80-C-0104 ..... N82-28505
F30602-80-C-0133 ..... N82-28556
F30602-80-C-0186 ..... N82-29161
F30602-81-C-0008 ..... N82-29157
F30602-81-C-0249 ..... N82-29018
F33615-77-C-1132 ..... N82-28554
F33615-77-C-1172 ..... N82-28523
F33615-78-C-0063 ..... N82-28305
N82-28306
F33615-78-C-2024 ..... N82-28462
N82-28463
N82-28464
F33615-78-C-2070 ..... N82-28286
F33615-78-D-0617 ..... N82-29010
F33615-79-C-2007 ..... N82-28647
F33615-79-C-3616 ..... N82-28291
F33615-79-C-5030 ..... N82-28415
F33615-79-C-5082 ..... N82-28358
F33615-79-C-5129 ..... N82-28357
F33615-80-C-1077 ..... N82-28292
F33615-80-C-1218 ..... N82-28272
F33615-80-C-2004 ..... N82-28284
F33615-80-C-5089 ..... N82-28416
F33615-80-K-3627 ..... N82-29012
F33615-81-C-5050 ..... N82-28358
F49620-78-C-0024 ..... N82-28583
F49620-78-C-0104 ..... N82-28418
F49620-79-C-0038 ..... N82-29259
F49620-79-C-0059 ..... N82-28359
F49620-79-C-0161 ..... N82-29077
F49620-80-C-0002 ..... N82-29070
F49620-80-C-0006 ..... N82-29160
F49620-80-C-0015 ..... N82-28588
F49620-80-C-0073 ..... N82-28553
F49620-80-C-0094 ..... N82-28636
F49620-81-C-0072 ..... N82-29078
MDA903-80-C-0098 ..... N82-29158
MDA903-80-C-0155 ..... N82-28511
MDA903-80-C-0519 ..... N82-29221
MDA903-81-C-0100 ..... N82-29201
MDA903-81-C-0180 ..... N82-28526
N82-28527
N82-28528
N82-28530
MDA903-81-C-0375 ..... N82-29218
MIPR-FY76-20810-0019 ..... N82-28517
MIPR-8311-00-89 ..... N82-28459
MR0410103 ..... N82-28987
M0095PN001 ..... N82-29008
M0933PN004 ..... N82-28987
NAG1-18 ..... N82-28576
NAG2-100 ..... N82-28986
NAG3-57 ..... N82-28409
NAG3-149 ..... N82-28503
NAS1-14213 ..... N82-28664
NAS1-15116 ..... N82-28269
NAS1-15325 ..... N82-28296
NAS1-16087 ..... N82-28313
NAS1-16095 ..... N82-28266
NAS1-16199 ..... N82-28243
NAS1-16410 ..... N82-28298
NAS1-16489 ..... N82-29022
NAS1-16572 ..... N82-28573
NAS2-6552 ..... N82-28312
NAS2-7358 ..... N82-29251
NAS2-7620 ..... N82-28281
NAS2-10741 ..... N82-28698
NAS3-20629 ..... N82-28297
NAS3-20632 ..... N82-28296
NAS3-22532 ..... N82-28253
NAS4-2834 ..... N82-28300
NAS5-24300 ..... N82-29021
N82-29023
N82-29025
N82-29026
NAS5-25819 ..... N82-28501
NAS5-25985 ..... N82-28500
NAS5-26097 ..... N82-29243
NAS5-26651 ..... N82-28349
NAS5-26714 ..... N82-28879
NAS7-100 ..... N82-28330
N82-28502
N82-28618
N82-28619
N82-28642
N82-28699
N82-28732
N82-28733
N82-28735
N82-28784
N82-28785
N82-29112
NAS8-34627 ..... N82-28881
NAS9-15652 ..... N82-29004
NAS9-16008 ..... N82-29003
N82-29006
NAS 9-16399 ..... N82-28578
NA79AA-D-00121 ..... N82-29146
NA80SA-C-00763 ..... N82-28774
NBS-5-35944 ..... N82-28615
NB80-NADA-1036 ..... N82-29227
NCA2-OR450-001 ..... N82-28251
NCC2-55 ..... N82-28572
NCC2-67 ..... N82-29005
NCC2-76 ..... N82-29074
N82-29111
NGR-21-027-004 ..... N82-29217
NIVR-RB-1854 ..... N82-28303
NIVR-1725 ..... N82-28433
NIVR-1739 ..... N82-28263
NIVR-1773 ..... N82-29119
N82-29120
NIVR-1777 ..... N82-28685
NIVR-1822 ..... N82-28685
NIVR-1823 ..... N82-28685
NIVR-1868 ..... N82-28686
NIVR-1869 ..... N82-28434
NOAA-04-78-B01-7 ..... N82-28851
NR PROJ. SR0-101 ..... N82-29007
NR PROJ. 039-153 ..... N82-28628
NR PROJ. 042-280 ..... N82-29100
NR PROJ. 042-443 ..... N82-29080
NR PROJ. 049-383 ..... N82-28512
NR PROJ. 051-258 ..... N82-29126
NR PROJ. 051-622 ..... N82-29178
NR PROJ. 051-693 ..... N82-28381
NR PROJ. 051-744 ..... N82-28376
NR PROJ. 056-596 ..... N82-28373

NR PROJ. 056-749 ..... N82-28633
NR PROJ. 056-766 ..... N82-28384
N82-28385
NR PROJ. 092-255 ..... N82-28453
NR PROJ. 092-555 ..... N82-28452
N82-28677
NR PROJ. 097-441 ..... N82-28582
NR PROJ. 170-906 ..... N82-28997
NR PROJ. 205-043 ..... N82-28386
NR PROJ. 243-030 ..... N82-29202
NR PROJ. 251-043 ..... N82-28551
NR PROJ. 356-504 ..... N82-28670
NR PROJ. 359-713 ..... N82-29207
NR PROJ. 365-049 ..... N82-29096
NR PROJ. 370-050 ..... N82-28623
NR PROJ. 388-002 ..... N82-29164
NR PROJ. 394-503 ..... N82-29205
NS-15766 ..... N82-28986
NSF ATM-77-23747 ..... N82-28874
NSF ATM-77-23757 ..... N82-28603
N82-28920
N82-28921
N82-28923
N82-28924
N82-28925
N82-28928
N82-28929
NSF CEE-81-08119 ..... N82-28479
NSF DAR-74-11490 ..... N82-28490
NSF DMB-80-20250 ..... N82-29205
NSF DMR-78-24185 ..... N82-23373
NSF ECS-79-19880 ..... N82-28512
NSF ENV-77-15333 ..... N82-28487
N82-28488
NSF ENV-77-22947 ..... N82-28854
NSF IST-79-21977 ..... N82-29044
NSF MCS-77-23738 ..... N82-29044
NSF MCS-79-02971 ..... N82-29053
NSF MCS-79-21024 ..... N82-29053
NSF MCS-79-24370 ..... N82-29018
NSF OCE-78-20719 ..... N82-28944
NSF OCE-80-24913 ..... N82-28944
NSF PFR-79-08979 ..... N82-28489
NSF-2396 ..... N82-28579
NSG-1248 ..... N82-28246
NSG-1321 ..... N82-28666
NSG-1414 ..... N82-28345
NSG-1592 ..... N82-28282
NSG-3011 ..... N82-28350
NSG-7172 ..... N82-28304
N00013-81-K-0624 ..... N82-28386
N00014-67-A-0385-0022 ..... N82-28420
N00014-75-C-0192 ..... N82-29164
N00014-75-C-0264 ..... N82-28420
N00014-75-C-0397 ..... N82-29126
N00014-75-C-0439 ..... N82-29100
N00014-75-C-0451 ..... N82-29096
N00014-75-C-0518 ..... N82-29162
N00014-75-C-0569 ..... N82-29011
N82-29082
N82-29083
N82-29101
N82-29105
N00014-75-C-0970 ..... N82-28373
N00014-75-C-1183 ..... N82-28512
N00014-76-C-0200 ..... N82-28670
N00014-76-C-0370 ..... N82-29015
N00014-76-C-0408 ..... N82-28452
N82-28453
N82-28677
N00014-76-C-0482 ..... N82-29124
N00014-76-C-0527 ..... N82-29113
N00014-76-C-0838 ..... N82-29178
N00014-77-C-0075 ..... N82-28584
N00014-77-C-0165 ..... N82-29052
N00014-77-C-0388 ..... N82-28273
N82-28649
N00014-77-C-0581 ..... N82-28628
N00014-78-C-0204 ..... N82-28608
N00014-78-C-0543 ..... N82-29098
N00014-78-C-0592 ..... N82-28381
N00014-79-C-0021 ..... N82-28448
N00014-79-C-0176 ..... N82-28382
N00014-79-C-0365 ..... N82-28591
N00014-79-C-0725 ..... N82-28795
N00014-79-C-0873 ..... N82-29018
N00014-80-C-0109 ..... N82-28582
N00014-80-C-0387 ..... N82-28907
N82-29051
N00014-80-C-0391 ..... N82-28551
N00014-80-C-0408 ..... N82-29080
N00014-80-C-0445 ..... N82-29202
N00014-80-C-0472 ..... N82-28633
N00014-80-C-0491 ..... N82-28376
N00014-80-C-0515 ..... N82-28625
N00014-80-C-0566 ..... N82-29109
N00014-80-C-0622 ..... N82-29015
N00014-80-C-0647 ..... N82-29053
N00014-81-C-0204 ..... N82-28446
N00014-81-C-0307 ..... N82-29207
N00014-81-C-0377 ..... N82-28589
N00014-81-C-0680 ..... N82-28288
N00014-81-C-2376 ..... N82-28620
N82-28621
N00014-81-F-0028 ..... N82-28932
N82-28933
N00014-81-G-0089 ..... N82-28590
N00014-81-K-0143 ..... N82-29007
N00014-81-K-0186 ..... N82-28679
N00014-81-K-0197 ..... N82-28997
N00014-81-K-0210 ..... N82-28581
N00014-81-K-0269 ..... N82-29044
N00014-81-K-0291 ..... N82-29166
N00014-81-K-0598 ..... N82-28384
N82-28385
N00014-81-K-0620 ..... N82-29205
N00014-81-K-0689 ..... N82-29129
N00014-82-C-0049 ..... N82-28931
N00014-82-K-0076 ..... N82-29162
N00019-79-C-0633 ..... N82-28356
N00024-79-C-6043 ..... N82-28587
N00024-81-WR-10497 ..... N82-28580
N00167-78-C-0039 ..... N82-28480
N00173-79-C-0134 ..... N82-28623
N00173-80-C-0226 ..... N82-28622
N00173-80-C-0493 ..... N82-29177
N00228-79-C-A414 ..... N82-28508
N00228-80-C-QE83 ..... N82-28888
N61339-78-C-014 ..... N82-28999
N61339-78-C-0060 ..... N82-28988
N62269-79-C-0261 ..... N82-28367
N62269-81-C-0231 ..... N82-28552
N62269-81-C-0243 ..... N82-28294
N62269-81-C-0810 ..... N82-28792
N66001-81-C-0310 ..... N82-28794
ONR PROJ. 042-442 ..... N82-28907
RF62581801 ..... N82-28551
RR0110941 ..... N82-28592
RR0140501 ..... N82-29102
RR0220148 ..... N82-28417
RR03300244 ..... N82-29049
SF12141491 ..... N82-28520
SF59551002 ..... N82-28631
SF65571692 ..... N82-28378
SRI PROJ. PYU-1924 ..... N82-28466
SR0230101 ..... N82-28581
W-31-109-ENG-38 ..... N82-28569
N82-28947
W-7405-ENG-26 ..... N82-28389
N82-28399
N82-28400
N82-28401
N82-28428
N82-28482
N82-28611
N82-28651
N82-28748
N82-28754
N82-28755
N82-28756
N82-28758
N82-28760
N82-28761
N82-28762
N82-28763
N82-28797
N82-28821
N82-28824
N82-28844
N82-28845
N82-29063
N82-29084
N82-29168
N82-29184
N82-29212
W-7405-ENG-36 ..... N82-28388
N82-28390
N82-28391
N82-28596
N82-28610
N82-28848
N82-29058
N82-29059
N82-29132
N82-29133
N82-29136
N82-29142
N82-29189
W-7405-ENG-48 ..... N82-28362
N82-28392
N82-28393
N82-28421
N82-28422
N82-28423
N82-28456
N82-28468
N82-28470
N82-28484
N82-28564
N82-28594
N82-28595
N82-28751
N82-28764
N82-28766
N82-28796
N82-28801
N82-28804
N82-28826
N82-28851
N82-28852
N82-28871
N82-28940
N82-29060
N82-29134
N82-29135
N82-29139
N82-29141
N82-29144
N82-29169
N82-29185
N82-29186
W-7405-ENG-81 ..... N82-28753
W-7405-ENG-82 ..... N82-28361
N82-28394
N82-28395
N82-28396
N82-28397
N82-28406
N82-28424
N82-28425
N82-28531
N82-28565
N82-29210
WF4140000 ..... N82-28989
WF11100000 ..... N82-28792
W0513CC00 ..... N82-28888
XF11111801 ..... N82-28794
ZF00001042 ..... N82-29097
ZF51524004 ..... N82-28992
ZF61512001 ..... N82-28593
ZR01301 ..... N82-28379
159-41-06-02 ..... N82-29155
199-60-62 ..... N82-29005
N82-29006
307-01-02-04 ..... N82-28839
505-31-11 ..... N82-28251
505-31-33-07 ..... N82-28248
505-31-43-06 ..... N82-28304
505-32-2B N82-28250
505-32-42 ..... N82-28644
N82-28645
N82-28646
505-32-52 ..... N82-28247
N82-28253
505-32-72 ..... N82-28460
505-32-82 ..... N82-28605
505-33-53-02 ..... N82-28280
505-34-43-06 ..... N82-29022
505-42-13-04 ..... N82-28282
505-42-21 ..... N82-28252
505-43-02 ..... N82-28249
505-63-40 ..... N82-28300
506-51-33-01 ..... N82-28575
506-53-43-02 ..... N82-28665
506-53-43-04 ..... N82-28346
506-55-72 ..... N82-28445
511-58-12 ..... N82-28643
534-02-13-21 ..... N82-28299
658-80-05 ..... N82-28698

REPORT / ACCESSION NUMBER INDEX

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-8902 ..... N82-28577* #
A-8940 ..... N82-28252* #

AC-272 ..... N82-28347 #

ACBU-SER-III-16 ..... N82-28866 #

AD-A106998 ..... N82-29157 #
AD-A107045 ..... N82-28271 #
AD-A107046 ..... N82-28740 #
AD-A107112 ..... N82-28669 #
AD-A107119 ..... N82-28506 #
AD-A107278 ..... N82-28507 #
AD-A107379 ..... N82-28863 #
AD-A107392 ..... N82-29109 #
AD-A107394 ..... N82-29124 #
AD-A107395 ..... N82-29202 #
AD-A107402 ..... N82-29218 #
AD-A107432 ..... N82-28883 #
AD-A107433 ..... N82-28882 #
AD-A107434 ..... N82-28884 #
AD-A107446 ..... N82-28508 #
AD-A107456 ..... N82-28307 #
AD-A107503 ..... N82-28620 #
AD-A107526 ..... N82-28551 #
AD-A107527 ..... N82-28621 #
AD-A111181 ..... N82-29000 #
AD-A111195 ..... N82-28997 #
AD-A111392 ..... N82-28999 #
AD-A111537 ..... N82-28418 #
AD-A111639 ..... N82-28946 #
AD-A111708 ..... N82-28993 #
AD-A111821 ..... N82-28992 #
AD-A111834 ..... N82-28945 #
AD-A111836 ..... N82-29244 #
AD-A111897 ..... N82-28991 #
AD-A112179 ..... N82-28319 #
AD-A112186 ..... N82-28607 #
AD-A112264 ..... N82-28372 #
AD-A112293 ..... N82-28930 #
AD-A112328 ..... N82-28461 #
AD-A112464 ..... N82-28622 #
AD-A112475 ..... N82-28988 #
AD-A112501 ..... N82-29201 #
AD-A112569 ..... N82-28306 #
AD-A112570 ..... N82-28305 #
AD-A112585 ..... N82-28446 #
AD-A112593 ..... N82-28505 #
AD-A112603 ..... N82-28987 #
AD-A112644 ..... N82-28792 #
AD-A112681 ..... N82-28462 #
AD-A112682 ..... N82-28463 #
AD-A112683 ..... N82-28464 #
AD-A112691 ..... N82-28291 #
AD-A112797 ..... N82-28580 #
AD-A112864 ..... N82-28411 #
AD-A112867 ..... N82-28257 #
AD-A112868 ..... N82-28906 #
AD-A112873 ..... N82-29257 #
AD-A112886 ..... N82-29178 #
AD-A112899 ..... N82-28311 #
AD-A112900 ..... N82-28310 #
AD-A112901 ..... N82-28629 #
AD-A112904 ..... N82-28376 #
AD-A112907 ..... N82-28630 #
AD-A112913 ..... N82-29206 #
AD-A112914 ..... N82-29162 #
AD-A112918 ..... N82-28655 #
AD-A112919 ..... N82-28275 #
AD-A112924 ..... N82-28244 #
AD-A112929 ..... N82-29044 #
AD-A112930 ..... N82-29097 #
AD-A112949 ..... N82-29096 #
AD-A112950 ..... N82-28632 #
AD-A112955 ..... N82-29227 #
AD-A112957 ..... N82-28274 #
AD-A112977 ..... N82-28380* #
AD-A112980 ..... N82-28581 #
AD-A112984 ..... N82-29081 #
AD-A113004 ..... N82-28742 #
AD-A113013 ..... N82-28583 #
AD-A113016 ..... N82-28450 #
AD-A113018 ..... N82-28514 #
AD-A113019 ..... N82-29107 #
AD-A113020 ..... N82-28582 #
AD-A113027 ..... N82-29077 #
AD-A113029 ..... N82-28465 #
AD-A113033 ..... N82-28379 #
AD-A113034 ..... N82-28902 #
AD-A113036 ..... N82-29007 #
AD-A113038 ..... N82-28670 #
AD-A113042 ..... N82-28517 #
AD-A113076 ..... N82-28314 #
AD-A113077 ..... N82-29079 #
AD-A113085 ..... N82-28348 #
AD-A113088 ..... N82-28862 #
AD-A113104 ..... N82-29078 #
AD-A113107 ..... N82-28904 #
AD-A113110 ..... N82-28903 #
AD-A113113 ..... N82-28990 #
AD-A113114 ..... N82-28287 #
AD-A113116 ..... N82-28378 #
AD-A113126 ..... N82-29104 #
AD-A113128 ..... N82-28359 #
AD-A113130 ..... N82-29220 #
AD-A113134 ..... N82-28416 #
AD-A113136 ..... N82-28309 #
AD-A113139 ..... N82-29256 #
AD-A113148 ..... N82-28375 #
AD-A113154 ..... N82-28900 #
AD-A113155 ..... N82-28901 #
AD-A113168 ..... N82-28521 #
AD-A113169 ..... N82-28743 #
AD-A113172 ..... N82-29067 #
AD-A113173 ..... N82-29068 #
AD-A113175 ..... N82-28899 #
AD-A113176 ..... N82-28898 #
AD-A113177 ..... N82-28897 #
AD-A113178 ..... N82-28896 #
AD-A113179 ..... N82-28895 #
AD-A113180 ..... N82-28894 #
AD-A113190 ..... N82-28558 #
AD-A113191 ..... N82-28516 #
AD-A113193 ..... N82-28555 #
AD-A113210 ..... N82-28672 #
AD-A113224 ..... N82-28893 #
AD-A113225 ..... N82-28892 #
AD-A113226 ..... N82-28891 #
AD-A113227 ..... N82-28890 #
AD-A113228 ..... N82-28889 #
AD-A113229 ..... N82-28449 #
AD-A113239 ..... N82-28301 #
AD-A113240 ..... N82-28905 #
AD-A113250 ..... N82-28515 #
AD-A113253 ..... N82-28556 #
AD-A113254 ..... N82-28557 #
AD-A113255 ..... N82-29069 #
AD-A113257 ..... N82-29047 #
AD-A113262 ..... N82-29045 #
AD-A113270 ..... N82-28459 #
AD-A113294 ..... N82-28480 #
AD-A113307 ..... N82-29108 #
AD-A113331 ..... N82-29219 #
AD-A113354 ..... N82-28585 #
AD-A113355 ..... N82-28793 #
AD-A113356 ..... N82-28256 #
AD-A113374 ..... N82-28888 #
AD-A113378 ..... N82-28586 #
AD-A113379 ..... N82-28518 #
AD-A113380 ..... N82-28415 #
AD-A113383 ..... N82-29161 #
AD-A113388 ..... N82-29016 #
AD-A113394 ..... N82-28520 #
AD-A113409 ..... N82-28648 #
AD-A113415 ..... N82-29048 #
AD-A113422 ..... N82-29080 #
AD-A113428 ..... N82-28519 #
AD-A113429 ..... N82-29046 #
AD-A113439 ..... N82-28559 #
AD-A113459 ..... N82-29221 #
AD-A113463 ..... N82-28302 #
AD-A113484 ..... N82-28377 #
AD-A113485 ..... N82-28631 #
AD-A113486 ..... N82-28417 #
AD-A113487 ..... N82-29049 #
AD-A113493 ..... N82-28320 #
AD-A113497 ..... N82-28273 #
AD-A113498 ..... N82-28794 #
AD-A113499 ..... N82-29179 #
AD-A113500 ..... N82-28656 #
AD-A113501 ..... N82-28864 #
AD-A113504 ..... N82-28324 #
AD-A113511 ..... N82-28286 #
AD-A113518 ..... N82-28649 #
AD-A113520 ..... N82-28258 #
AD-A113529 ..... N82-29128 #
AD-A113530 ..... N82-29127 #
AD-A113534 ..... N82-28584 #
AD-A113535 ..... N82-29163 #
AD-A113536 ..... N82-28308 #
AD-A113557 ..... N82-28255 #
AD-A113559 ..... N82-28373 #
AD-A113560 ..... N82-28554 #
AD-A113578 ..... N82-28998 #
AD-A113582 ..... N82-28647 #
AD-A113584 ..... N82-28741 #
AD-A113597 ..... N82-29177 #
AD-A113606 ..... N82-28358 #
AD-A113608 ..... N82-28623 #
AD-A113633 ..... N82-28284 #
AD-A113640 ..... N82-28886 #
AD-A113644 ..... N82-28272 #
AD-A113654 ..... N82-28356 #
AD-A113659 ..... N82-28625 #
AD-A113664 ..... N82-28885 #
AD-A113665 ..... N82-28842 #
AD-A113666 ..... N82-28843 #
AD-A113667 ..... N82-28626 #
AD-A113672 ..... N82-28841 #
AD-A113683 ..... N82-28860 #
AD-A113687 ..... N82-29226 #
AD-A113689 ..... N82-28357 #
AD-A113699 ..... N82-29176 #
AD-A113704 ..... N82-28887 #
AD-A113707 ..... N82-29259 #
AD-A113742 ..... N82-28511 #
AD-A113761 ..... N82-28283 #

AD-A113764 ..... N82-29205 #
AD-A113765 ..... N82-28315 #
AD-A113780 ..... N82-28374 #
AD-A113786 ..... N82-29050 #
AD-A113806 ..... N82-28989 #
AD-A113807 ..... N82-29203 #
AD-A113812 ..... N82-29159 #
AD-A113822 ..... N82-28553 #
AD-A113825 ..... N82-28859 #
AD-A113826 ..... N82-28413 #
AD-A113831 ..... N82-28414 #
AD-A113834 ..... N82-28608 #
AD-A113839 ..... N82-29070 #
AD-A113840 ..... N82-28512 #
AD-A113845 ..... N82-29158 #
AD-A113848 ..... N82-28861 #
AD-A113849 ..... N82-28347 #
AD-A113864 ..... N82-28627 #
AD-A113877 ..... N82-29095 #
AD-A113906 ..... N82-28412 #
AD-A113910 ..... N82-28624 #
AD-A113911 ..... N82-29160 #
AD-A113913 ..... N82-28509 #
AD-A113916 ..... N82-29015 #
AD-A113928 ..... N82-28355 #
AD-A113936 ..... N82-29204 #
AD-A113937 ..... N82-28447 #
AD-A113955 ..... N82-29009 #
AD-A113957 ..... N82-28267 #
AD-A113975 ..... N82-28448 #
AD-A113981 ..... N82-29076 #
AD-A113982 ..... N82-28292 #
AD-A114004 ..... N82-28285 #
AD-A114026 ..... N82-28552 #
AD-A114043 ..... N82-29125 #
AD-A114053 ..... N82-29232 #
AD-A114054 ..... N82-29126 #
AD-A114057 ..... N82-28342 #
AD-A114062 ..... N82-28628 #
AD-A114067 ..... N82-29008 #
AD-A114068 ..... N82-28510 #
AD-A114070 ..... N82-28513 #
AD-A114085 ..... N82-29181 #
AD-A114086 ..... N82-28387 #
AD-A114099 ..... N82-28658 #
AD-A114101 ..... N82-28288 #
AD-A114105 ..... N82-28360 #
AD-A114106 ..... N82-28481 #
AD-A114107 ..... N82-28587 #
AD-A114114 ..... N82-29011 #
AD-A114115 ..... N82-29082 #
AD-A114116 ..... N82-28529 #
AD-A114117 ..... N82-28293 #
AD-A114119 ..... N82-28530 #
AD-A114120 ..... N82-28526 #
AD-A114121 ..... N82-28527 #
AD-A114122 ..... N82-28528 #
AD-A114124 ..... N82-29113 #
AD-A114125 ..... N82-28522 #
AD-A114126 ..... N82-28931 #
AD-A114127 ..... N82-28466 #
AD-A114133 ..... N82-29105 #
AD-A114134 ..... N82-29167 #
AD-A114135 ..... N82-28934 #
AD-A114138 ..... N82-29228 #
AD-A114149 ..... N82-28548 #
AD-A114150 ..... N82-28911 #
AD-A114154 ..... N82-28524 #
AD-A114155 ..... N82-28560 #
AD-A114156 ..... N82-28383 #
AD-A114165 ..... N82-29180 #
AD-A114167 ..... N82-29012 #
AD-A114168 ..... N82-28678 #
AD-A114169 ..... N82-28907 #
AD-A114187 ..... N82-28419 #
AD-A114188 ..... N82-29102 #
AD-A114189 ..... N82-29209 #
AD-A114190 ..... N82-28420 #
AD-A114191 ..... N82-28609 #
AD-A114196 ..... N82-28382 #
AD-A114199 ..... N82-29018 #
AD-A114206 ..... N82-28639 #
AD-A114217 ..... N82-28588 #
AD-A114220 ..... N82-28638 #
AD-A114224 ..... N82-28908 #
AD-A114226 ..... N82-29129 #
AD-A114238 ..... N82-28453 #
AD-A114239 ..... N82-28452 #
AD-A114243 ..... N82-29208 #
AD-A114246 ..... N82-28634 #
AD-A114250 ..... N82-28636 #
AD-A114254 ..... N82-29100 #
AD-A114255 ..... N82-29260 #
AD-A114257 ..... N82-29055 #
AD-A114258 ..... N82-28589 #
AD-A114260 ..... N82-28321 #
AD-A114274 ..... N82-28385 #
AD-A114275 ..... N82-28592 #
AD-A114278 ..... N82-28384 #
AD-A114282 ..... N82-28633 #
AD-A114291 ..... N82-28525 #
AD-A114298 ..... N82-28677 #
AD-A114300 ..... N82-29165 #
AD-A114302 ..... N82-29123 #
AD-A114304 ..... N82-29099 #
AD-A114309 ..... N82-29166 #
AD-A114310 ..... N82-28591 #
AD-A114311 ..... N82-28865 #
AD-A114313 ..... N82-28939 #
AD-A114319 ..... N82-28563 #
AD-A114321 ..... N82-28455 #
AD-A114322 ..... N82-28909 #
AD-A114324 ..... N82-28343 #
AD-A114325 ..... N82-28935 #
AD-A114326 ..... N82-29101 #
AD-A114327 ..... N82-29083 #
AD-A114334 ..... N82-29053 #
AD-A114335 ..... N82-28454 #
AD-A114336 ..... N82-28637 #
AD-A114342 ..... N82-29130 #
AD-A114343 ..... N82-28933 #
AD-A114345 ..... N82-28467 #
AD-A114348 ..... N82-28593 #
AD-A114349 ..... N82-28936 #
AD-A114351 ..... N82-28932 #
AD-A114364 ..... N82-29010 #
AD-A114365 ..... N82-28867 #
AD-A114366 ..... N82-28590 #
AD-A114368 ..... N82-28290 #
AD-A114369 ..... N82-28866 #
AD-A114370 ..... N82-28679 #
AD-A114371 ..... N82-29052 #
AD-A114376 ..... N82-28868 #
AD-A114377 ..... N82-28451 #
AD-A114380 ..... N82-28268 #
AD-A114381 ..... N82-28351 #
AD-A114382 ..... N82-28910 #
AD-A114383 ..... N82-29147 #
AD-A114384 ..... N82-28260 #
AD-A114392 ..... N82-28657 #
AD-A114396 ..... N82-28994 #
AD-A114400 ..... N82-29098 #
AD-A114405 ..... N82-28261 #
AD-A114414 ..... N82-29164 #
AD-A114417 ..... N82-29054 #
AD-A114418 ..... N82-28795 #
AD-A114419 ..... N82-28650 #
AD-A114422 ..... N82-28245 #
AD-A114423 ..... N82-28561 #
AD-A114424 ..... N82-28386 #
AD-A114427 ..... N82-28523 #
AD-A114428 ..... N82-28294 #
AD-A114429 ..... N82-28937 #
AD-A114430 ..... N82-28938 #
AD-A114435 ..... N82-28289 #
AD-A114436 ..... N82-28635 #
AD-A114437 ..... N82-28562 #
AD-A114443 ..... N82-28381 #
AD-A114444 ..... N82-29207 #
AD-A114447 ..... N82-28259 #
AD-A114448 ..... N82-28673 #
AD-A114449 ..... N82-29051 #
AD-A115091 ..... N82-28659 #
AD-A115750 ..... N82-28476 #

AD-E300951 ..... N82-28990 #
AD-E400796 ..... N82-28461 #
AD-E400798 ..... N82-28308 #
AD-E400804 ..... N82-28459 #
AD-E410514 ..... N82-29163 #
AD-E750422 ..... N82-29219 #
AD-E850101 ..... N82-28884 #
AD-E850103 ..... N82-28882 #
AD-E850104 ..... N82-28883 #
AD-E850131 ..... N82-28896 #
AD-E850132 ..... N82-28897 #
AD-E850133 ..... N82-28900 #
AD-E850134 ..... N82-28894 #
AD-E850135 ..... N82-28895 #
AD-E850136 ..... N82-28901 #
AD-E850139 ..... N82-28893 #
AD-E850140 ..... N82-28891 #
AD-E850141 ..... N82-28892 #
AD-E850142 ..... N82-28889 #
AD-E850143 ..... N82-28890 #
AD-E850144 ..... N82-28898 #
AD-E850145 ..... N82-28899 #
AD-E850148 ..... N82-28902 #
AD-E850150 ..... N82-28903 #
AD-E850152 ..... N82-28887 #
AD-E950228 ..... N82-28626 #
AD-E950243 ..... N82-28658 #

AD-F300009 ..... N82-28465 #
AD-F300012 ..... N82-29108 #
AD-F300017 ..... N82-28287 #
AD-F300023 ..... N82-29125 #
AD-F300025 ..... N82-28258 #
AD-F500004 ..... N82-29128 #
AD-F500005 ..... N82-29127 #
AD-F500007 ..... N82-28378 #
AD-F500009 ..... N82-28379 #

AECL-6807 ..... N82-28837 #

AEDC-TR-81-29 ..... N82-28383 #

AFAMRL-TR-81-50 ..... N82-29010 #
AFAMRL-TR-82-12 ..... N82-28841 #
AFAMRL-TR-82-13 ..... N82-28267 #

AFESC/ESL-TR-81-43 ..... N82-28268 #
AFESC/ESL-TR-81-53-V-2-P-1 ..... N82-28842 #
AFESC/ESL-TR-81-53-V-2-P-2 ..... N82-28843 #

AFGL-TP-304 ..... N82-29256 #

AFGL-TR-81-0216 ..... N82-29076 #
AFGL-TR-81-0253 ..... N82-29256 #
AFGL-TR-81-0282-2 ..... N82-28862 #
AFGL-TR-81-0300 ..... N82-28372 #
AFGL-TR-81-0351 ..... N82-28904 #
AFGL-TR-81-0354 ..... N82-28348 #
AFGL-TR-81-0357 ..... N82-28859 #
AFGL-TR-81-0363 ..... N82-28865 #
AFGL-TR-82-0015 ..... N82-28886 #
AFGL-TR-82-0044 ..... N82-28347 #
AFGL-TR-82-0062 ..... N82-29130 #
AFGL-TR-82-0075 ..... N82-28866 #
AFGL-TR-82-0077 ..... N82-28259 #
AFGL-TR-82-0083 ..... N82-28868 #

AFHRL-TR-81-44-VOL-2 ..... N82-28305 #
AFHRL-TR-81-44-VOL-3 ..... N82-28306 #
AFHRL-TR-81-53 ..... N82-28302 #

AFOSR-82-0080TR ..... N82-28418 #
AFOSR-82-0091TR ..... N82-28991 #
AFOSR-82-0120TR ..... N82-28375 #
AFOSR-82-0122TR ..... N82-28678 #
AFOSR-82-0212TR ..... N82-28359 #
AFOSR-82-0213TR ..... N82-28583 #
AFOSR-82-0215TR ..... N82-28450 #
AFOSR-82-0226TR ..... N82-29259 #
AFOSR-82-0244TR ..... N82-29104 #
AFOSR-82-0245TR ..... N82-28314 #
AFOSR-82-0255TR ..... N82-28514 #
AFOSR-82-0261TR ..... N82-29079 #
AFOSR-82-0264TR ..... N82-29078 #
AFOSR-82-0267TR ..... N82-29107 #
AFOSR-82-0271TR ..... N82-29077 #
AFOSR-82-0288TR ..... N82-28627 #
AFOSR-82-0289TR ..... N82-29160 #
AFOSR-82-0300TR ..... N82-29070 #
AFOSR-82-0309TR ..... N82-28553 #
AFOSR-82-0329TR ..... N82-28609 #
AFOSR-82-0330TR ..... N82-29208 #
AFOSR-82-0339TR ..... N82-28451 #
AFOSR-82-0344TR ..... N82-28636 #
AFOSR-82-0367TR ..... N82-28588 #

AFRPL-TR-81-55 ..... N82-28467 #

AFWAL-TR-81-1113 ..... N82-28523 #
AFWAL-TR-81-1219 ..... N82-28554 #
AFWAL-TR-81-1229 ..... N82-28272 #
AFWAL-TR-81-1263 ..... N82-28292 #
AFWAL-TR-81-2042 ..... N82-28647 #
AFWAL-TR-81-2087-PT-1 ..... N82-28462 #
AFWAL-TR-81-2087-PT-2 ..... N82-28463 #

AFWAL-TR-81-2087-PT-3 ..... N82-28464 #
AFWAL-TR-81-2125 ..... N82-28286 #
AFWAL-TR-81-2128 ..... N82-28284 #
AFWAL-TR-81-3086 ..... N82-28291 #
AFWAL-TR-81-4168-VOL-1 ..... N82-28415 #
AFWAL-TR-81-4175 ..... N82-28357 #
AFWAL-TR-82-4004 ..... N82-28358 #

AFWL-TR-81-28 ..... N82-28624 #

AIAA-82-0678 ..... N82-28280* #

AMA-81-37 ..... N82-28269* #
AMA-82-6 ..... N82-28313* #

AMMRC-TR-81-40 ..... N82-28419 #
AMMRC-TR-82-1 ..... N82-28412 #
AMMRC-TR-82-20 ..... N82-28447 #

ANL/OEPM-81-7 ..... N82-28569 #

ANL/OTEC-BCM-023 ..... N82-28947 #

AR-1 ..... N82-29202 #
AR-3 ..... N82-28656 #
AR-002-271 ..... N82-28265 #
AR-002-326 ..... N82-28311 #
AR-002-572 ..... N82-28630 #
AR-002-631 ..... N82-28629 #
AR-002-741 ..... N82-28885 #
AR-002-753 ..... N82-28354 #
AR-002-821 ..... N82-28741 #

ARBRL-CR-00478 ..... N82-29125 #

ARBRL-MR-03152 ..... N82-28465 #
ARBRL-MR-03157 ..... N82-28287 #
ARBRL-MR-03161 ..... N82-28258 #

ARBRL-TR-02391 ..... N82-29108 #

ARCSL-SP-81021 ..... N82-29163 #

ARL-SYS-REPT-24 ..... N82-28265 #

ARL-TR-82-15 ..... N82-28931 #

ARL/AERO-TM-324-PT-8 ..... N82-28310 #
ARL/AERO-TM-335 ..... N82-28311 #

ARL/PSU/TM-81-245 ..... N82-28587 #

ARL/STRUC-TM-332 ..... N82-28906 #

ARLCB-TR-82004 ..... N82-28672 #

ARLCD-CR-82002 ..... N82-28459 #

ARO-13356.10-CH-X ..... N82-28455 #
ARO-16064.4-M ..... N82-29095 #
ARO-16091.5-E ..... N82-28301 #
ARO-16127.6-CH ..... N82-28455 #
ARO-16184.18-C ..... N82-28449 #
ARO-16608.1-P ..... N82-28507 #
ARO-16669.13-M ..... N82-29099 #
ARO-16669.17-M ..... N82-29050 #
ARO-16728.5-CH ..... N82-28454 #
ARO-17062.2-E ..... N82-28466 #
ARO-17459.2-E ..... N82-28374 #
ARO-18029.1-GS ..... N82-28905 #
ARO-18029.2-GS ..... N82-28637 #

ARPAD-CR-82001 ..... N82-28461 #

ARTSD-TR-81002 ..... N82-28308 #

ATMOSPHERIC-SCIENCE-PAPER-348 N82-28878 #

ATR-1 ..... N82-28386 #
ATR-1 ..... N82-29205 #
ATR-82(8415)-1 ..... N82-29247 #

AVRADCOM-TR-82-C-6 ..... N82-28643* #
AVRADCOM-TR-82-C-7 ..... N82-28645* #
AVRADCOM-TR-82-C-8 ..... N82-28646* #

AWS/TN-81/003 ..... N82-28903 #
AWS/TN-82/001 ..... N82-28902 #

A276-4 ..... N82-28505 #

B-101-6 ..... N82-28816 #
B-206064 ..... N82-28264 #

BBN-4535-VOL-1 ..... N82-29121 #
BBN-4535-VOL-2 ..... N82-29122 #
BBN-4674-VOL-1 ..... N82-29067 #
BBN-4674-VOL-2 ..... N82-29068 #
BBN-4916 ..... N82-28510 #

BDX-613-2722 ..... N82-28316 #
BDX-613-2730 ..... N82-28430 #

BEES(W)-81-42 ..... N82-28994 #

BM-IC-8848 ..... N82-28438 #
BM-IC-8861 ..... N82-28769 #

BM-OFR-144-81 ..... N82-28768 #

BM-RI-8556 ..... N82-28493 #
BM-RI-8568 ..... N82-28614 #
BM-RI-8570 ..... N82-28436 #
BM-RI-8574 ..... N82-28435 #
BM-RI-8583 ..... N82-28439 #
BM-RI-8602 ..... N82-28437 #

BM-SP-8-81 ..... N82-28776 #

BMFT-FB-T-79-177 ..... N82-28366 #

BMVG-FBWT-80-17 ..... N82-29103 #

BNL-30062 ..... N82-28469 #
BNL-51412 ..... N82-29190 #

BR-13050 ..... N82-28562 #

BR81874 ..... N82-28497
BR82096 ..... N82-28617
BR82645 ..... N82-28696
BR82754 ..... N82-28504
BR82792 ..... N82-28254
BR82844 ..... N82-28856
BR82845 ..... N82-28667
BR82846 ..... N82-28791
BR82847 ..... N82-28663
BR83015 ..... N82-28546
BR83016 ..... N82-28498
BR83066 ..... N82-29019
BR83095 ..... N82-29156

CALSPAN-6396-A-1 ..... N82-28595 #

CA8105398 ..... N82-28837 #

CCS-402 ..... N82-29011 #
CCS-411 ..... N82-29082 #
CCS-412 ..... N82-29083 #
CCS-414 ..... N82-29101 #
CCS-415 ..... N82-29105 #

CECOM-82-1 ..... N82-28860 #

CELSS-13 ..... N82-29006* #

CERL-TR-M-307 ..... N82-28517 #

CERL-TR-P-121 ..... N82-28518 #

CERN-81-03 ..... N82-29017 #

CERN/SPS/80-17 ..... N82-29136 #

CIRC-848-A ..... N82-28688 #
CIRC-875 ..... N82-28689 #

CMI-781120-6 ..... N82-28775 #

CNES-NT-95 ..... N82-28494 #

CONF-810469-5 ..... N82-28468 #
CONF-810812-39 ..... N82-28469 #
CONF-810940-14 ..... N82-28797 #
CONF-810940-17 ..... N82-28389 #
CONF-810940-19 ..... N82-28482 #
CONF-810968-1 ..... N82-28995 #
CONF-811006-5 ..... N82-28844 #
CONF-811007-7 ..... N82-28845 #
CONF-811023-6 ..... N82-28471 #
CONF-811040-147 ..... N82-29188 #

CONF-811041-2 ..... N82-28470 #

CRC-TN-709-E ..... N82-28499 #

CRIF-MT-146 ..... N82-28687 #

CRREL-SR-81-19 ..... N82-28740 #

CRREL-82-7 ..... N82-29204 #

CSIE-82-5 ..... N82-29007 #

CSIR/CENG-371 ..... N82-28601 #

CSL-TR-222 ..... N82-29228 #

CSM-82-01 ..... N82-28511 #

CUED/B-ELECT/TR-65 ..... N82-28541 #

CUED/C-MATS/TR-82-1981 ..... N82-28653 #

CUED/F-CAMS/TR-205-1980 ..... N82-28539 #

DAI-TR-254 ..... N82-29221 #

DCW-R-21-04 ..... N82-28583 #

DELET-TR-80-0302 ..... N82-28562 #

DELNV-266-01 ..... N82-29167 #

DE81-028593 ..... N82-29057 #
DE81-029063 ..... N82-28749 #
DE81-030307 ..... N82-29132 #
DE81-030814 ..... N82-28995 #
DE81-700008 ..... N82-29192 #
DE81-700125 ..... N82-29065 #
DE81-700128 ..... N82-29193 #
DE81-700130 ..... N82-29086 #
DE81-700373 ..... N82-29191 #
DE81-700397 ..... N82-29110 #
DE81-700548 ..... N82-28837 #
DE82-000131 ..... N82-28797 #
DE82-000162 ..... N82-28389 #
DE82-000165 ..... N82-28482 #
DE82-000776 ..... N82-28469 #
DE82-000783 ..... N82-28755 #
DE82-000786 ..... N82-28754 #
DE82-000787 ..... N82-28756 #
DE82-000851 ..... N82-28753 #
DE82-000852 ..... N82-28761 #
DE82-000853 ..... N82-28760 #
DE82-000855 ..... N82-28762 #
DE82-000856 ..... N82-28763 #
DE82-000886 ..... N82-28821 #
DE82-000908 ..... N82-29061 #
DE82-001049 ..... N82-29223 #
DE82-001063 ..... N82-28470 #
DE82-001144 ..... N82-28796 #
DE82-001419 ..... N82-29137 #
DE82-001420 ..... N82-29138 #
DE82-001471 ..... N82-28845 #
DE82-001865 ..... N82-29058 #
DE82-001894 ..... N82-28822 #
DE82-002253 ..... N82-28758 #
DE82-002299 ..... N82-29131 #
DE82-002455 ..... N82-28483 #
DE82-002467 ..... N82-28748 #
DE82-002505 ..... N82-28829 #
DE82-002506 ..... N82-28828 #
DE82-002507 ..... N82-28827 #
DE82-002534 ..... N82-29136 #
DE82-002536 ..... N82-28808 #
DE82-002558 ..... N82-28471 #
DE82-002706 ..... N82-28850 #
DE82-002792 ..... N82-28844 #
DE82-002825 ..... N82-28751 #
DE82-002900 ..... N82-29183 #
DE82-002925 ..... N82-28402 #
DE82-003006 ..... N82-28809 #
DE82-003079 ..... N82-28870 #
DE82-003108 ..... N82-28810 #
DE82-003140 ..... N82-28816 #
DE82-003178 ..... N82-28468 #
DE82-003204 ..... N82-29133 #
DE82-003326 ..... N82-28807 #
DE82-003472 ..... N82-28399 #
DE82-003681 ..... N82-29169 #
DE82-003705 ..... N82-28942 #

DE82-003893 ..... N82-29062 #
DE82-003894 ..... N82-28681 #
DE82-003976 ..... N82-28815 #
DE82-004025 ..... N82-28852 #
DE82-004176 ..... N82-28391 #
DE82-004179 ..... N82-28388 #
DE82-004180 ..... N82-28390 #
DE82-004193 ..... N82-29182 #
DE82-004259 ..... N82-28811 #
DE82-004260 ..... N82-28869 #
DE82-004323 ..... N82-28804 #
DE82-004408 ..... N82-28806 #
DE82-004477 ..... N82-29213 #
DE82-004514 ..... N82-28680 #
DE82-004519 ..... N82-28820 #
DE82-004560 ..... N82-28484 #
DE82-004649 ..... N82-29184 #
DE82-004651 ..... N82-29084 #
DE82-004653 ..... N82-29168 #
DE82-004656 ..... N82-28400 #
DE82-004667 ..... N82-29085 #
DE82-004668 ..... N82-28611 #
DE82-004672 ..... N82-29063 #
DE82-004676 ..... N82-29059 #
DE82-004680 ..... N82-28610 #
DE82-004681 ..... N82-28848 #
DE82-004688 ..... N82-28817 #
DE82-004699 ..... N82-28651 #
DE82-004722 ..... N82-29150 #
DE82-004775 ..... N82-28531 #
DE82-004791 ..... N82-28813 #
DE82-004819 ..... N82-29139 #
DE82-004877 ..... N82-28914 #
DE82-004885 ..... N82-28830 #
DE82-004887 ..... N82-29215 #
DE82-004898 ..... N82-28404 #
DE82-004927 ..... N82-28913 #
DE82-004936 ..... N82-28871 #
DE82-004951 ..... N82-29135 #
DE82-004952 ..... N82-28393 #
DE82-005103 ..... N82-28916 #
DE82-005105 ..... N82-28398 #
DE82-005109 ..... N82-28764 #
DE82-005113 ..... N82-28812 #
DE82-005114 ..... N82-28818 #
DE82-005119 ..... N82-28566 #
DE82-005134 ..... N82-28423 #
DE82-005135 ..... N82-28422 #
DE82-005139 ..... N82-28801 #
DE82-005140 ..... N82-28421 #
DE82-005141 ..... N82-28392 #
DE82-005145 ..... N82-28940 #
DE82-005147 ..... N82-28564 #
DE82-005208 ..... N82-28473 #
DE82-005245 ..... N82-28800 #
DE82-005258 ..... N82-29134 #
DE82-005259 ..... N82-28799 #
DE82-005302 ..... N82-29140 #
DE82-005449 ..... N82-28361 #
DE82-005451 ..... N82-29210 #
DE82-005453 ..... N82-28424 #
DE82-005454 ..... N82-28395 #
DE82-005469 ..... N82-29143 #
DE82-005474 ..... N82-28941 #
DE82-005483 ..... N82-28823 #
DE82-005484 ..... N82-28917 #
DE82-005534 ..... N82-28750 #
DE82-005535 ..... N82-28746 #
DE82-005536 ..... N82-28765 #
DE82-005544 ..... N82-28744 #
DE82-005547 ..... N82-28396 #
DE82-005569 ..... N82-28747 #
DE82-005572 ..... N82-28745 #
DE82-005577 ..... N82-28425 #
DE82-005581 ..... N82-28397 #
DE82-005583 ..... N82-28565 #
DE82-005584 ..... N82-28752 #
DE82-005588 ..... N82-28802 #
DE82-005589 ..... N82-28803 #
DE82-005592 ..... N82-28428 #
DE82-005614 ..... N82-29212 #
DE82-005615 ..... N82-28814 #
DE82-005619 ..... N82-28406 #
DE82-005621 ..... N82-28394 #
DE82-005650 ..... N82-29144 #
DE82-005652 ..... N82-29141 #
DE82-005676 ..... N82-28568 #
DE82-005718 ..... N82-28570 #
DE82-005755 ..... N82-29151 #
DE82-005770 ..... N82-29229 #
DE82-005879 ..... N82-29149 #
DE82-005910 ..... N82-28849 #
DE82-005947 ..... N82-28824 #
DE82-005995 ..... N82-28401 #
DE82-005999 ..... N82-28851 #
DE82-006179 ..... N82-28594 #
DE82-006182 ..... N82-29186 #
DE82-006185 ..... N82-28805 #
DE82-006187 ..... N82-29185 #
DE82-006196 ..... N82-28315 #
DE82-006197 ..... N82-28567 #
DE82-006209 ..... N82-28831 #
DE82-006226 ..... N82-28834 #
DE82-006248 ..... N82-29170 #
DE82-006250 ..... N82-29060 #
DE82-006251 ..... N82-28826 #
DE82-006267 ..... N82-28403 #
DE82-006736 ..... N82-28456 #
DE82-006777 ..... N82-28362 #
DE82-006788 ..... N82-28595 #
DE82-006828 ..... N82-28819 #
DE82-006829 ..... N82-29064 #
DE82-006831 ..... N82-28532 #
DE82-006843 ..... N82-29190 #
DE82-006891 ..... N82-28407 #
DE82-006904 ..... N82-28474 #
DE82-006923 ..... N82-28766 #
DE82-006964 ..... N82-29152 #
DE82-006994 ..... N82-28833 #
DE82-007032 ..... N82-28569 #
DE82-007034 ..... N82-29142 #
DE82-007037 ..... N82-28947 #
DE82-007040 ..... N82-28832 #
DE82-007360 ..... N82-28596* #
DE82-007361 ..... N82-29189 #
DE82-007363 ..... N82-29187 #
DE82-007366 ..... N82-29188 #
DE82-007370 ..... N82-28825 #
DE82-007522 ..... N82-28682 #
DE82-007524 ..... N82-28405 #
DE82-007565 ..... N82-28835 #
DE82-007566 ..... N82-28836 #
DE82-007626 ..... N82-28316 #
DE82-007645 ..... N82-28430 #
DE82-010243 ..... N82-28759 #
DE82-012762 ..... N82-28426 #
DE82-900158 ..... N82-28846 #
DE82-900852 ..... N82-29148 #
DE82-901277 ..... N82-29222 #
DE82-901280 ..... N82-29106 #
DE82-901286 ..... N82-28547 #
DE82-901287 ..... N82-28472 #
DE82-901291 ..... N82-28798 #
DE82-901293 ..... N82-28847 #
DE82-901313 ..... N82-28429 #
DE82-901315 ..... N82-29114 #
DE82-901346 ..... N82-28427 #
DE82-901427 ..... N82-28912 #
DE82-901428 ..... N82-28757 #
DE82-901431 ..... N82-29236 #

DFVLR-FB-81-38 ..... N82-28600 #
DFVLR-FB-82-03 ..... N82-28853 #

DFVLR-MITT-81-33 ..... N82-28535 #

DM-35 ..... N82-28918 #

DOE/AL-16223/1 ..... N82-28568 #

DOE/ER-01545/317 ..... N82-29140 #
DOE/ER-02026/41 ..... N82-28407 #
DOE/ER-04721/5 ..... N82-28402 #
DOE/ER-04949/1 ..... N82-28405 #
DOE/ER-10381/3 ..... N82-28404 #
DOE/ER-10389/2 ..... N82-28423 #
DOE/ER-10556/86 ..... N82-28682 #
DOE/ER-10575/2 ..... N82-28830 #
DOE/ER-10887/1 ..... N82-29215 #
DOE/ER-40035/1 ..... N82-29170 #

DOE/ET-11326/1-PT-1/PT-2 ..... N82-28787* #
DOE/ET-20279/153 ..... N82-28832 #
DOE/ET-51013/24 ..... N82-29186 #
DOE/ET-53016/75 ..... N82-29187 #

DOE/EV-1005/07 ..... N82-28941 #
DOE/EV-04500/2 ..... N82-29143 #
DOE/EV-10154/2 ..... N82-29152 #
DOE/EV-10610/01 ..... N82-28917 #
DOE/EV-10694/T1 ..... N82-28942 #

DOE/ID-12200/T1 ..... N82-28834 #

DOE/MC-14036/T1 ..... N82-28403 #

DOE/NASA/0032-15 ..... N82-29235* #
DOE/NASA/51044-24 ..... N82-28786* #

DOE/PC-40778/T1 ..... N82-28473 #

DOE/PETC/TR-82/6 ..... N82-28759 #

DOE/R5-10301/1 ..... N82-28831 #

DOE/TIC-7000/R5-APP ..... N82-29229 #
DOE/TIC-2006904 ..... N82-28474 #

DOT-FAA-ASF-82-1 ..... N82-29012 #

DOT-FAA-CT-82-30 ..... N82-28293 #

DOT-FAA-RD-82-17 ..... N82-28529 #
DOT-FAA-RD-82-21 ..... N82-29012 #

DOT-TSC-RSPA-81-10 ..... N82-28278* #

DREO-R-852 ..... N82-28519 #

DREO-TN-81-25 ..... N82-29046 #

DREV-R-4245/82 ..... N82-28559 #

DRIC-T-6493 ..... N82-28663
DRIC-T-6565 ..... N82-28791
DRIC-T-6575 ..... N82-28667

DRSMI/QR-1-TR ..... N82-28658 #

DRSMI/RR-82-1-TR ..... N82-28626 #

DRXRO-IP-L-16728-C ..... N82-28454 #

DTNSRDC/PAS-81/36 ..... N82-28480 #
DTNSRDC/PAS-82/11 ..... N82-28593 #

D180-25927-3 ..... N82-28284 #
D180-26653-1 ..... N82-28664* #
D182-10816-1 ..... N82-28552 #

E-1013 ..... N82-28247* #
E-1073 ..... N82-28460* #
E-1211 ..... N82-28605* #
E-1228 ..... N82-28250* #
E-1234 ..... N82-28646* #
E-1235 ..... N82-28645* #
E-1249 ..... N82-28445* #
E-1263 ..... N82-28249* #
E-1295 ..... N82-28644* #
E-1324 ..... N82-29075* #

EA-80-U-051 ..... N82-28271 #

EC/2112901 ..... N82-29161 #

ECRC/R-1486 ..... N82-28495 #

EGG-GTH-5599 ..... N82-28800 #
EGG-GTH-5673 ..... N82-28849 #

EGG-1183-1758 ..... N82-28752 #

EMD-82-38 ..... N82-29234 #
EMD-82-60 ..... N82-28781 #

EOARD-TR-82-6 ..... N82-28586 #
EOARD-TR-82-7 ..... N82-28256 #
EOARD-TR-82-8 ..... N82-28793 #
EOARD-TR-82-9 ..... N82-28585 #

EPA-460/3-81-023 ..... N82-28654 #
EPA-550/9-81-404 ..... N82-28496 #

EPRI-AP-2100 ..... N82-28847 #
EPRI-AP-2113 ..... N82-28798 #
EPRI-AP-2117-VOL-1 ..... N82-28472 #

EPRI-CS-81-9-LD ..... N82-28846 #
EPRI-CS-1992-VOL-2 ..... N82-28428 #
EPRI-CS-2118 ..... N82-28427 #

EPRI-EA-2090-VOL-1 ..... N82-29106 #
EPRI-EA-2154 ..... N82-29222 #

EPRI-EM-2112 ..... N82-28547 #

EPRI-NP-2055 ..... N82-29148 #
EPRI-NP-2089 ..... N82-29114 #
EPRI-NP-2114-SR ..... N82-28429 #

ERADCOM/ASL-TR-0107-V2-SUPPL . N82-29054 #

ERC-R-80031 ..... N82-28803 #
ERC-R-81015 ..... N82-28799 #
ERC-R-81027 ..... N82-28802 #

ERIM-145400-14-F ..... N82-29160 #
ERIM-149100-1-T ..... N82-28383 #
ERIM-150800-29-F ..... N82-28292 #

ERL-0190-TR ..... N82-28630 #
ERL-0216-TR ..... N82-28629 #
ERL-0229-TR ..... N82-28741 #

ERT-A653-F ..... N82-28774 #

ERT-PB002 ..... N82-28742 #

ESD-TR-81-330 ..... N82-28563 #
ESD-TR-81-332 ..... N82-29209 #
ESD-TR-81-395 ..... N82-28342 #
ESD-TR-82-001 ..... N82-28525 #
ESD-TR-82-002 ..... N82-28515 #
ESD-TR-82-006 ..... N82-28513 #
ESD-TR-82-008 ..... N82-28548 #

ESN-36-3 ..... N82-29260 #

ES84 ..... N82-28317* #

ETL-0269 ..... N82-28742 #

EUR-6848-FR ..... N82-28602 #

FAA-EM-82-15 ..... N82-28275 #

FAA-MS-81-5 ..... N82-28244 #

FAA-RD-81-61 ..... N82-28274 #

FB-52 ..... N82-29001 #

FCC/OST-R81-1 ..... N82-28540 #

FE-2762-8 ..... N82-28403 #

FFA-135 ..... N82-28571 #

FHWA/RD-80/047 ..... N82-29238 #
FHWA/RD-81/160 ..... N82-29173 #

FHWA/TX-81/28-223-6 ..... N82-29239 #
FHWA/TX-81/29-228-7 ..... N82-29240 #

FOA-C-20448-E2 ..... N82-28919 #
FOA-C-30262-E1 ..... N82-28613 #
FOA-C-30265-E2 ..... N82-29088 #

FPL-FSRN-0244 ..... N82-28669 #

FTD-ID(RS)T-0027-82 ..... N82-28245 #
FTD-ID(RS)T-0056-82 ..... N82-28351 #
FTD-ID(RS)T-0140-82 ..... N82-29147 #
FTD-ID(RS)T-0141-82 ..... N82-28560 #
FTD-ID(RS)T-0303-82 ..... N82-29165 #
FTD-ID(RS)T-1388-80 ..... N82-28561 #
FTD-ID(RS)T-1449-81 ..... N82-28321 #
FTD-ID(RS)T-1669-81 ..... N82-28910 #
FTD-ID(RS)T-1721-81 ..... N82-28908 #
FTD-ID(RS)T-1722-81 ..... N82-28909 #

FUB-27-1981 ..... N82-29087 #
FUB-28-1981 ..... N82-29066 #
FUB-30-1981 ..... N82-28533 #
FUB-31-1981 ..... N82-28534 #

FZA-535 ..... N82-28288 #

GJBX-240-81-VOL-1 ..... N82-28749 #
GJBX-318-81 ..... N82-28763 #
GJBX-319-81 ..... N82-28762 #

GJBX-320-81 ..... N82-28761 #
GJBX-321-81 ..... N82-28760 #
GJBX-323-81 ..... N82-28753 #
GJBX-324-81 ..... N82-28754 #
GJBX-325-81 ..... N82-28755 #
GJBX-326-81 ..... N82-28756 #
GJBX-362-81 ..... N82-28748 #
GJBX-385-81-VOL-1 ..... N82-28744 #
GJBX-385-81-VOL-2 ..... N82-28745 #
GJBX-387-81-VOL-1 ..... N82-28746 #
GJBX-387-81-VOL-2 ..... N82-28747 #
GJBX-388-81-VOL-1 ..... N82-28765 #
GJBX-408-81-VOL-1 ..... N82-28750 #

GO-62244 ..... N82-28556 #

GPO-91-557 ..... N82-29233 #

HAC-W-08193 ..... N82-28557 #

HDL-TR-1970 ..... N82-29176 #

HR-81-269-16-59 ..... N82-29158 #

IAF-82-319 ..... N82-28345* #

IKE-K-68 ..... N82-28838 #

IKE-5-215 ..... N82-28597 #

INP-1084/PL ..... N82-29110 #

INW-8101 ..... N82-28612 #
INW-8102 ..... N82-28344 #

IPF-81-8 ..... N82-29196 #
IPF-81-9 ..... N82-29197 #
IPF-81-11 ..... N82-29198 #
IPF-81-13 ..... N82-29199 #

IPNO-PHN-80-22 ..... N82-29211 #

IPPJ-573 ..... N82-29175 #

IR-2 ..... N82-28466 #
IR-2 ..... N82-28772 #
IR-607 ..... N82-28501* #

IRT-8205-003-VOL-2 ..... N82-28862 #

IS-M-355 ..... N82-28531 #

IS-T-939 ..... N82-28424 #
IS-T-940 ..... N82-28396 #
IS-T-954 ..... N82-28425 #
IS-T-956 ..... N82-28397 #
IS-T-957 ..... N82-28395 #
IS-T-966 ..... N82-28565 #
IS-T-967 ..... N82-29210 #
IS-T-974 ..... N82-28361 #
IS-T-978 ..... N82-28394 #
IS-T-980 ..... N82-28406 #

ISBN-0-7988-2144-2 ..... N82-28601 #
ISBN-0-8330-370-4 ..... N82-29146 #
ISBN-0-8330-0395-X ..... N82-28840 #
ISBN-0-86999-556-1 ..... N82-28948 #
ISBN-3-88148-191-5 ..... N82-28857
ISBN-3-88148-192-3 ..... N82-28858
ISBN-3-88148-193-1 ..... N82-28876
ISBN-951-668-135-1 ..... N82-28443 #
ISBN-0173-6892 ..... N82-28838 #
ISBN-0355-721 ..... N82-28443 #

ISSN-0012-4130 ..... N82-28858
ISSN-0067-0340 ..... N82-28878 #
ISSN-0071-9196 ..... N82-28872 #
ISSN-0072-4130 ..... N82-28857
ISSN-0072-4130 ..... N82-28876
ISSN-0110-1191 ..... N82-29236 #
ISSN-0110-1692 ..... N82-29236 #
ISSN-0143-7313 ..... N82-28410
ISSN-0143-7313 ..... N82-28668
ISSN-0173-6892 ..... N82-28597 #
ISSN-0179-699X ..... N82-29245 #
ISSN-0280-2503 ..... N82-28683 #
ISSN-0309-6505 ..... N82-28653 #
ISSN-0309-7412 ..... N82-28541 #
ISSN-0340-8922 ..... N82-29171 #
ISSN-0348-7539 ..... N82-29195 #

ISSN-0348-7644 ..... N82-29172 #
ISSN-0374-1958 ..... N82-29241 #
ISSN-0436-1199 ..... N82-28598 #
ISSN-0436-1199 ..... N82-28599 #
ISSN-0436-1199 ..... N82-29118 #
ISSN-0581-1287 ..... N82-28877

ISWS-81-CON-279 ..... N82-28770 #

ISWS/CIR-149/81 ..... N82-28779 #

IU-53 ..... N82-29178 #

JAERI-M-9004 ..... N82-29192 #
JAERI-M-9040 ..... N82-29191 #
JAERI-M-9048 ..... N82-29065 #
JAERI-M-9127 ..... N82-29193 #
JAERI-M-9164 ..... N82-29086 #

JINR-E2-80-705 ..... N82-29214 #

JPL-PUB-82-19-PT-1 ..... N82-28325* #
JPL-PUB-82-19-PT-2 ..... N82-28330* #
JPL-PUB-82-23 ..... N82-28699* #
JPL-PUB-82-37-PT-1/PT-2 ..... N82-28787* #

JPL-PUBL-81-70 ..... N82-28790* #

JPRS-80789 ..... N82-28977 #
JPRS-81197 ..... N82-28949 #

JU81-DELENG-1R ..... N82-29162 #

K-UR-370 ..... N82-28756 #

K/UR-157 ..... N82-28763 #
K/UR-339 ..... N82-28762 #
K/UR-345 ..... N82-28761 #
K/UR-348 ..... N82-28760 #
K/UR-362 ..... N82-28753 #
K/UR-365 ..... N82-28754 #
K/UR-368 ..... N82-28755 #
K/UR-393 ..... N82-28748 #

KD-81-27 ..... N82-28272 #

KMRD-5.4-8107 ..... N82-28922 #

L-14659 ..... N82-28665* #
L-15109 ..... N82-28248* #
L-15392 ..... N82-28839* #

LA-TR-81-30 ..... N82-29136 #
LA-TR-81-31 ..... N82-29131 #
LA-TR-81-37 ..... N82-29133 #

LA-UR-81-2407 ..... N82-29132 #

LA-8493-MS ..... N82-29058 #
LA-8502-M ..... N82-29059 #
LA-8511-PR ..... N82-29189 #
LA-8813-MS ..... N82-29072 #
LA-8872 ..... N82-28596* #
LA-8886-MS ..... N82-29057 #
LA-8903-MS ..... N82-29071 #
LA-8909 ..... N82-29058 #
LA-9008-MS ..... N82-28610 #
LA-9031-PR ..... N82-28388 #
LA-9032-PR ..... N82-28391 #
LA-9034-PR ..... N82-28390 #
LA-9051 ..... N82-29142 #
LA-9070-PR ..... N82-28848 #

LAIR-81-19TN ..... N82-28946 #
LAIR-113 ..... N82-28945 #

LBL-11902 ..... N82-28801 #
LBL-11989 ..... N82-28751 #
LBL-12927 ..... N82-28852 #
LBL-13309 ..... N82-29135 #
LBL-13318 ..... N82-28392 #
LBL-13421 ..... N82-29423 #
LBL-13453 ..... N82-28422 #
LBL-13465 ..... N82-28421 #
LBL-13480 ..... N82-28564 #
LBL-13579 ..... N82-28940 #
LBL-13604 ..... N82-29134 #
LBL-13605 ..... N82-29144 #
LBL-13634 ..... N82-28393 #
LBL-13727 ..... N82-29141 #

LC-80-607851 ..... N82-28493 #
LC-81-6102 ..... N82-28436 #
LC-81-10151 ..... N82-28435 #
LC-81-600180 ..... N82-28783* #
LC-81-607109 ..... N82-28437 #
LC-81-607845 ..... N82-28439 #
LC-82-3784 ..... N82-28840 #

LG81FR0095 ..... N82-28415 #

LIDS-FR-1165 ..... N82-29070 #

LIDS-P-1194 ..... N82-28512 #

LL-03075 ..... N82-29169 #

LNS-TH-006 ..... N82-29131 #

LR-30079 ..... N82-28243* #

MASEC-R-81-065 ..... N82-28816 #
MASEC-R-81-071 ..... N82-28815 #
MASEC-R-81-086 ..... N82-28817 #

MBB-UB-542-81-O ..... N82-28322 #

MBB-UD-340-82-O/E ..... N82-28364 #
MBB-UD-341-82-O ..... N82-28365 #

MBB-UR-534-82-O ..... N82-29154 #
MBB-UR-535-82-O ..... N82-28652 #

MBB-509-O ..... N82-28457 #
MBB-512-82-O ..... N82-28536 #
MBB-513-82-O ..... N82-28537 #
MBB-515-82-O ..... N82-28431 #
MBB-543/81-O ..... N82-29237 #

MBL-1981-2 ..... N82-28996 #

MIT-EL-82-002 ..... N82-28628 #

MIT/LCS/TM-215 ..... N82-29015 #

MITSG-81-14 ..... N82-28458 #

MITT-160 ..... N82-28872 #

MLM-2873-OP ..... N82-28471 #

MPI-PAE/EXTRATERR-171 ..... N82-29171 #
MPI-PAE/EXTRATERR-172 ..... N82-29245 #

MPIS-1/1982 ..... N82-28599 #
MPIS-16/1981 ..... N82-28598 #
MPIS-20/1981 ..... N82-29118 #

MQAD-TP-797 ..... N82-28617

MRL-R-835 ..... N82-28885 #
MRL-R-844 ..... N82-28354 #

MSC/TFR/1201/1801 ..... N82-28356 #
MSC/TFR/1214/1502 ..... N82-28359 #

MTI-82TR20 ..... N82-28648 #
MTI-91ASE229QT13 ..... N82-29235* #

MTR-8277 ..... N82-28342 #

MWRRC-115 ..... N82-28771 #

NADC-81157-30 ..... N82-28792 #
NADC-81305-60 ..... N82-28989 #
NADC-82023-60 ..... N82-28552 #
NADC-82053-60 ..... N82-28294 #

NAMRL-1260 ..... N82-28987 #
NAMRL-1282 ..... N82-28992 #

NAS 1.15:73297 ..... N82-28606* #
NAS 1.15:73298 ..... N82-28690* #
NAS 1.15:81231 ..... N82-28295* #
NAS 1.15:82473 ..... N82-28317* #
NAS 1.15:82483 ..... N82-29094* #
NAS 1.15:82836 ..... N82-28786* #
NAS 1.15:82841 ..... N82-28605* #
NAS 1.15:82859 ..... N82-28643* #
NAS 1.15:82860 ..... N82-28250* #
NAS 1.15:82865 ..... N82-28646* #
NAS 1.15:82866 ..... N82-28645* #
NAS 1.15:82873 ..... N82-28445* #
NAS 1.15:82885 ..... N82-28249* #
NAS 1.15:82910 ..... N82-28644* #
NAS 1.15:82916 ..... N82-28460* #
NAS 1.15:82931 ..... N82-29075* #
NAS 1.15:83270 ..... N82-29225* #
NAS 1.15:83291 ..... N82-28280* #
NAS 1.15:84235 ..... N82-29155* #
NAS 1.15:84247 ..... N82-28252* #
NAS 1.15:84259 ..... N82-28577* #
NAS 1.15:84488 ..... N82-28346* #
NAS 1.15:84492 ..... N82-28248* #
NAS 1.15:84499 ..... N82-28299* #
NAS 1.15:84500 ..... N82-28575* #
NAS 1.15:84710 ..... N82-28380* #
NAS 1.15:84711 ..... N82-28278* #
NAS 1.15:84766 ..... N82-29043* #
NAS 1.15:84782 ..... N82-29024* #
NAS 1.15:84783 ..... N82-29025* #
NAS 1.15:84784 ..... N82-29038* #
NAS 1.15:84785 ..... N82-29039* #
NAS 1.15:84786 ..... N82-29041* #
NAS 1.15:84787 ..... N82-29032* #
NAS 1.15:84788 ..... N82-29026* #
NAS 1.15:84789 ..... N82-29031* #
NAS 1.15:84790 ..... N82-29040* #
NAS 1.15:84791 ..... N82-29041* #
NAS 1.15:84792 ..... N82-29042* #
NAS 1.15:84793 ..... N82-29029* #
NAS 1.15:84794 ..... N82-29028* #
NAS 1.15:84795 ..... N82-29030* #
NAS 1.15:84796 ..... N82-29027* #
NAS 1.15:84797 ..... N82-29033* #
NAS 1.15:84798 ..... N82-29036* #
NAS 1.15:84799 ..... N82-29034* #
NAS 1.15:84800 ..... N82-29056* #
NAS 1.15:84801 ..... N82-29035* #
NAS 1.15:84802 ..... N82-29023* #
NAS 1.15:84803 ..... N82-29037* #
NAS 1.21:455 ..... N82-28783* #
NAS 1.21:7011(33) N82-28695*
NAS 1.21:7011(232) N82-28984*
NAS 1.21:7011(233) N82-28985*
NAS 1.26:3525 ..... N82-28664* #
NAS 1.26:3561 ..... N82-28313* #
NAS 1.26:3571 ..... N82-28881* #
NAS 1.26:3572 ..... N82-28298* #
NAS 1.26:3573 ..... N82-28246* #
NAS 1.26:3574 ..... N82-28269* #
NAS 1.26:3584 ..... N82-28573* #
NAS 1.26:137803 ..... N82-28281* #
NAS 1.26:165556 ..... N82-28297* #
NAS 1.26:165573 ..... N82-28296* #
NAS 1.26:165596 ..... N82-28253* #
NAS 1.26:165604 ..... N82-28350* #
NAS 1.26:165605 ..... N82-28409* #
NAS 1.26:165890 ..... N82-28243* #
NAS 1.26:165926 ..... N82-29022* #
NAS 1.26:165936 ..... N82-28304* #
NAS 1.26:166335 ..... N82-28251* #
NAS 1.26:166354 ..... N82-28698* #
NAS 1.26:166358 ..... N82-29005* #
NAS 1.26:166359 ..... N82-29006* #
NAS 1.26:166360 ..... N82-28312* #
NAS 1.26:166366 ..... N82-29251* #
NAS 1.26:166820 ..... N82-28349* #
NAS 1.26:166821 ..... N82-28501* #
NAS 1.26:167392 ..... N82-29004* #
NAS 1.26:167625 ..... N82-28578* #
NAS 1.26:167626 ..... N82-29003* #
NAS 1.26:167907 ..... N82-29235* #
NAS 1.26:168939 ..... N82-29217* #
NAS 1.26:169100 ..... N82-28879* #
NAS 1.26:169101 ..... N82-28986* #
NAS 1.26:169103 ..... N82-28596* #
NAS 1.26:169124 ..... N82-28576* #
NAS 1.26:169125 ..... N82-28503* #
NAS 1.26:169126 ..... N82-28666* #
NAS 1.26:169127 ..... N82-28345* #
NAS 1.26:169128 ..... N82-29111* #
NAS 1.26:169129 ..... N82-28572* #
NAS 1.26:169130 ..... N82-28579* #
NAS 1.26:169131 ..... N82-28282* #
NAS 1.26:169132 ..... N82-29074* #
NAS 1.26:169133 ..... N82-28699* #
NAS 1.26:169134 ..... N82-28787* #
NAS 1.26:169135 ..... N82-28325* #
NAS 1.26:169136 ..... N82-28330* #
NAS 1.26:169142 ..... N82-28790* #
NAS 1.26:170391 ..... N82-28300* #
NAS 1.26:170424 ..... N82-29243* #
NAS 1.26:170428 ..... N82-28500* #
NAS 1.60;2039 ..... N82-28839* #
NAS 1.60:2030 ..... N82-28247* #
NAS 1.60:2032 ..... N82-28665* #
NAS 1.61:1096 ..... N82-28880* #

NASA-CASE-ARC-11267-2 ..... N82-28353*
NASA-CASE-ARC-11359-1 ..... N82-28444* #

NASA-CASE-LAR-12175-1 ..... N82-28279*
NASA-CASE-LAR-12709-1 ..... N82-28604*

NASA-CASE-LEW-13120-1 ..... N82-28440*
NASA-CASE-LEW-13343-1 ..... N82-28441*

NASA-CASE-MFS-23776-1 ..... N82-28545*
NASA-CASE-MFS-25430-1 ..... N82-28550* #

NASA-CASE-MSC-18498-1 ..... N82-29013*
NASA-CASE-MSC-18852-1 ..... N82-28640* #
NASA-CASE-MSC-18969-1 ..... N82-28318* #
NASA-CASE-MSC-20112-1 ..... N82-28641* #
NASA-CASE-MSC-20181-1 ..... N82-28549* #

NASA-CASE-NPO-13689-4 ..... N82-28780*
NASA-CASE-NPO-14782-1 ..... N82-28616*
NASA-CASE-NPO-14845-1 ..... N82-28442*
NASA-CASE-NPO-15015-1 ..... N82-28368*
NASA-CASE-NPO-15483-1 ..... N82-28642* #
NASA-CASE-NPO-15496-1 ..... N82-28784* #
NASA-CASE-NPO-15559-1 ..... N82-29112* #
NASA-CASE-NPO-15662-1 ..... N82-28785* #
NASA-CASE-NPO-15696-1 ..... N82-28619* #
NASA-CASE-NPO-15704-1 ..... N82-28502* #
NASA-CASE-NPO-15980-1 ..... N82-28618* #

NASA-CASE-XMS-03694-1 ..... N82-29002*

NASA-CR-3525 ..... N82-28664* #
NASA-CR-3561 ..... N82-28313* #
NASA-CR-3571 ..... N82-28881* #
NASA-CR-3572 ..... N82-28298* #
NASA-CR-3573 ..... N82-28246* #
NASA-CR-3574-PT-4 ..... N82-28269* #
NASA-CR-3584 ..... N82-28573* #
NASA-CR-137803 ..... N82-28281* #
NASA-CR-165556 ..... N82-28297* #
NASA-CR-165573 ..... N82-28296* #
NASA-CR-165596 ..... N82-28253* #
NASA-CR-165604 ..... N82-28350* #
NASA-CR-165605 ..... N82-28409* #
NASA-CR-165890 ..... N82-28243* #
NASA-CR-165919 ..... N82-28266* #
NASA-CR-165926 ..... N82-29022* #
NASA-CR-165936 ..... N82-28304* #
NASA-CR-166335 ..... N82-28251* #
NASA-CR-166354 ..... N82-28698* #
NASA-CR-166358 ..... N82-29005* #
NASA-CR-166359 ..... N82-29006* #
NASA-CR-166360 ..... N82-28312* #
NASA-CR-166366 ..... N82-29251* #
NASA-CR-166820 ..... N82-28349* #
NASA-CR-166821 ..... N82-28501* #
NASA-CR-167392 ..... N82-29004* #
NASA-CR-167625 ..... N82-28578* #
NASA-CR-167626 ..... N82-29003* #
NASA-CR-167907 ..... N82-29235* #
NASA-CR-168939 ..... N82-29217* #
NASA-CR-169100 ..... N82-28879* #
NASA-CR-169101 ..... N82-28986* #
NASA-CR-169103 ..... N82-28596* #
NASA-CR-169124 ..... N82-28576* #
NASA-CR-169125 ..... N82-28503* #
NASA-CR-169126 ..... N82-28666* #
NASA-CR-169127 ..... N82-28345* #
NASA-CR-169128 ..... N82-29111* #
NASA-CR-169129 ..... N82-28572* #
NASA-CR-169130 ..... N82-28579* #
NASA-CR-169131 ..... N82-28282* #
NASA-CR-169132 ..... N82-29074* #
NASA-CR-169133 ..... N82-28699* #
NASA-CR-169134 ..... N82-28787* #
NASA-CR-169135 ..... N82-28325* #
NASA-CR-169136 ..... N82-28330* #
NASA-CR-169142 ..... N82-28790* #
NASA-CR-170391 ..... N82-28300* #
NASA-CR-170424 ..... N82-29243* #
NASA-CR-170428 ..... N82-28500* #

NASA-EB-82-4 ..... N82-28323* #

NASA-RP-1096 ..... N82-28880* #

NASA-SP-455 ..... N82-28783* #
NASA-SP-7011(232) N82-28984*
NASA-SP-7011(233) N82-28985*
NASA-SP-7041(33) N82-28695*

NASA-TM-73297 ..... N82-28606* #
NASA-TM-73298 ..... N82-28690* #
NASA-TM-81231 ..... N82-28295* #
NASA-TM-82473 ..... N82-28317* #
NASA-TM-82483 ..... N82-29094* #
NASA-TM-82796 ..... N82-28574* #
NASA-TM-82836 ..... N82-28786* #
NASA-TM-82841 ..... N82-28605* #
NASA-TM-82859 ..... N82-28643* #
NASA-TM-82860 ..... N82-28250* #
NASA-TM-82865 ..... N82-28646* #
NASA-TM-82866 ..... N82-28645* #
NASA-TM-82873 ..... N82-28445* #
NASA-TM-82885 ..... N82-28249* #
NASA-TM-82910 ..... N82-28644* #
NASA-TM-82916 ..... N82-28460* #
NASA-TM-82931 ..... N82-29075* #
NASA-TM-83270 ..... N82-29225* #
NASA-TM-83291 ..... N82-28280* #
NASA-TM-84235 ..... N82-29155* #
NASA-TM-84247 ..... N82-28252* #
NASA-TM-84259 ..... N82-28577* #
NASA-TM-84488 ..... N82-28346* #
NASA-TM-84492 ..... N82-28248* #
NASA-TM-84499 ..... N82-28299* #
NASA-TM-84500 ..... N82-28575* #
NASA-TM-84710 ..... N82-28380* #
NASA-TM-84711 ..... N82-28278* #
NASA-TM-84766 ..... N82-29043* #
NASA-TM-84782 ..... N82-29024* #
NASA-TM-84783 ..... N82-29025* #
NASA-TM-84784 ..... N82-29038* #
NASA-TM-84785 ..... N82-29039* #
NASA-TM-84786 ..... N82-29021* #
NASA-TM-84787 ..... N82-29032* #
NASA-TM-84788 ..... N82-29026* #
NASA-TM-84789 ..... N82-29031* #
NASA-TM-84790 ..... N82-29040* #
NASA-TM-84791 ..... N82-29041* #
NASA-TM-84792 ..... N82-29042* #
NASA-TM-84793 ..... N82-29029* #
NASA-TM-84794 ..... N82-29028* #
NASA-TM-84795 ..... N82-29030* #
NASA-TM-84796 ..... N82-29027* #
NASA-TM-84797 ..... N82-29033* #
NASA-TM-84798 ..... N82-29036* #
NASA-TM-84799 ..... N82-29034* #
NASA-TM-84800 ..... N82-29056* #
NASA-TM-84801 ..... N82-29035* #
NASA-TM-84802 ..... N82-29023* #
NASA-TM-84803 ..... N82-29037* #

NASA-TP-2030 ..... N82-28247* #
NASA-TP-2032 ..... N82-28665* #
NASA-TP-2039 ..... N82-28839* #

NAVTRAEQUIPC-IH-332 ..... N82-28309 #

NAVTRAEQUIPC-TR-81-014 ..... N82-28999 #

NAVTRAEQUIPC-78-C-0060-11 ..... N82-28988 #

NBDL-81R009 ..... N82-29000 #
NBDL-82R001 ..... N82-29009 #

NBS-DIM-65-7 ..... N82-29230 #

NBS-GCR-81-345 ..... N82-28615 #

NBSIR-81-1641 ..... N82-28544 #
NBSIR-81-2303 ..... N82-28492 #
NBSIR-81-2358 ..... N82-28491 #
NBSIR-81-2406 ..... N82-28408 #

NCAR-CT-65 ..... N82-28920 #

NCAR/CT-62 ..... N82-28874 #
NCAR/CT-63 ..... N82-28921 #

NCAR/TN-167 ..... N82-28929 #
NCAR/TN-168 ..... N82-28923 #
NCAR/TN-171 ..... N82-28925 #
NCAR/TN-173 ..... N82-28924 #
NCAR/TN-176 ..... N82-28603 #
NCAR/TN-184 ..... N82-28928 #

NEPRF-CR-82-03 ..... N82-28888 #

NGS-20 ..... N82-28875 #

NIM-2130 ..... N82-28948 #

NLR-MP-81004-U ..... N82-28432 #
NLR-MP-81020-U ..... N82-28262 #
NLR-MP-81022-U ..... N82-28276 #
NLR-MP-81023-U ..... N82-28685 #

NLR-TR-79111-U ..... N82-29119 #
NLR-TR-80023-U ..... N82-28767 #
NLR-TR-80077-U ..... N82-28433 #
NLR-TR-80102-U ..... N82-28434 #
NLR-TR-80123-U ..... N82-28303 #
NLR-TR-81002-U ..... N82-29120 #
NLR-TR-81031-U ..... N82-28263 #
NLR-TR-81053-U ..... N82-28686 #

NOAA-DR-ERL-PMEL-3 ..... N82-28944 #

NOAA-TM-ERL-OWRM-6-PT-1 ..... N82-28926 #

NOAA-TM-ERL-WPL-77 ..... N82-28543 #
NOAA-TM-ERL-WPL-80 ..... N82-28542 #
NOAA-TM-ERL-WPL-92 ..... N82-28905 #
NOAA-TM-ERL-WPL-96 ..... N82-28637 #

NOAA-TR-NOS-90 ..... N82-28875 #

NOAA-81102004 ..... N82-28543 #
NOAA-81102104 ..... N82-28875 #
NOAA-81111604 ..... N82-28774 #
NOAA-81120311 ..... N82-28542 #
NOAA-81120312-PT-1 ..... N82-28926 #
NOAA-81120313 ..... N82-28944 #
NOAA-81120404 ..... N82-28458 #
NOAA-81120704 ..... N82-28927 #

NOO-RP-36 ..... N82-29226 #

NORDA-TN-113 ..... N82-28936 #
NORDA-TN-121 ..... N82-28932 #
NORDA-TN-122 ..... N82-28933 #
NORDA-TN-131 ..... N82-28343 #
NORDA-TN-132 ..... N82-28934 #
NORDA-TN-146 ..... N82-28935 #

NORDA-28 ..... N82-28938 #
NORDA-43 ..... N82-28937 #

NOSC-CR-111 ..... N82-28794 #

NPL-DMA(A)-38 ..... N82-28410

NPL-DMA(B)-23 ..... N82-28668

NPRDC-TN-82-11 ..... N82-28998 #

NPRDC-TR-82-36 ..... N82-29097 #

NPRDC-11-80-12 ..... N82-28998 #

NPS-NCAR-81-1-PT-2 ..... N82-29096 #

NPS54-82-002 ..... N82-29047 #
NPS55-82-007 ..... N82-29102 #
NPS63-81-003 ..... N82-28911 #
NPS67-81-02CR ..... N82-28508 #
NPS67-81-03CR ..... N82-28608 #
NPS67-81-015 ..... N82-28255 #
NPS68-81-002 ..... N82-29123 #
NPS69-81-006 ..... N82-28580 #

NRCC-LR-608 ..... N82-28285 #

NRL-MR-4749 ..... N82-28656 #
NRL-MR-4774 ..... N82-28638 #
NRL-MR-4780 ..... N82-28607 #
NRL-MR-4781 ..... N82-28592 #
NRL-MR-4782 ..... N82-29049 #
NRL-MR-4783 ..... N82-29179 #
NRL-MR-4787 ..... N82-28417 #
NRL-MR-4789 ..... N82-29016 #
NRL-MR-4790 ..... N82-29181 #
NRL-MR-4794 ..... N82-28864 #
NRL-MR-4798 ..... N82-28939 #
NRL-MR-4810 ..... N82-28631 #
NRL-MR-4811 ..... N82-28639 #
NRL-MR-4812 ..... N82-29180 #
NRL-MR-4814-PT-1 ..... N82-28387 #

NRL-8557 ..... N82-28520 #

NSF/CEE-81042 ..... N82-28489 #
NSF/CEE-81055 ..... N82-28487 #
NSF/CEE-81061 ..... N82-28488 #
NSF/CEE-81065 ..... N82-28854 #

NSF/MEA-81012 ..... N82-28490 #

NSMRL-978 ..... N82-29008 #

NSWC/DL-TR-3880 ..... N82-29055 #

NSWC/TR-80-414 ..... N82-28521 #
NSWC/TR-80-533 ..... N82-28379 #
NSWC/TR-81-127 ..... N82-28378 #
NSWC/TR-81-200 ..... N82-28743 #
NSWC/TR-81-391 ..... N82-29128 #
NSWC/TR-81-393 ..... N82-29127 #

NTIA-CR-81-14 ..... N82-28538 #

NTSB-SIR-81-7 ..... N82-28277 #

NUSC-TR-6569 ..... N82-29081 #

NVO-196-26 ..... N82-29150 #
NVO-196-28 ..... N82-29149 #

NYSERDA-81-13 ..... N82-28475 #

NZERDC-LF-2009-APP ..... N82-29236 #

NZERDC-62 ..... N82-28912 #
NZERDC-63 ..... N82-28757 #

N132 ..... N82-29096 #

ORNL-5833 ..... N82-28824 #

ORNL/CSD-87 ..... N82-29084 #
ORNL/CSD-88 ..... N82-28758 #

ORNL/TM-7662 ..... N82-28821 #
ORNL/TM-7901 ..... N82-29184 #
ORNL/TM-7930 ..... N82-28399 #
ORNL/TM-8025 ..... N82-28400 #
ORNL/TM-8027 ..... N82-28611 #
ORNL/TM-8037 ..... N82-28401 #
ORNL/TM-8096 ..... N82-29063 #

OWRT-A-129-MISS(2) ..... N82-28772 #

OWRT-B-046-MONT(1) ..... N82-28771 #

P-101-13 ..... N82-28483 #
P-101-16 ..... N82-28817 #

PANA-04 ..... N82-28507 #

PB82-134289 ..... N82-28536 #
PB82-134602 ..... N82-28653 #
PB82-134636 ..... N82-28541 #
PB82-135435 ..... N82-28438 #
PB82-135468 ..... N82-28769 #
PB82-135534 ..... N82-28614 #
PB82-135906 ..... N82-28493 #
PB82-135922 ..... N82-28615 #
PB82-136276 ..... N82-28277 #
PB82-138256 ..... N82-28366 #
PB82-138603 ..... N82-28278* #
PB82-138744 ..... N82-28491 #
PB82-139361 ..... N82-28492 #
PB82-140153 ..... N82-28494 #
PB82-141045 ..... N82-28437 #
PB82-141292 ..... N82-28539 #
PB82-141797 ..... N82-28408 #
PB82-142118 ..... N82-28489 #
PB82-142191 ..... N82-28540 #
PB82-142290 ..... N82-29240 #
PB82-142316 ..... N82-28367 #
PB82-142571 ..... N82-28768 #

PB82-142696 ..... N82-28948 #
PB82-142811 ..... N82-28495 #
PB82-142993 ..... N82-28601 #
PB82-143009 ..... N82-29239 #
PB82-143611 ..... N82-28602 #
PB82-145061 ..... N82-29238 #
PB82-145152 ..... N82-28475 #
PB82-145343 ..... N82-28770 #
PB82-145418 ..... N82-28436 #
PB82-145426 ..... N82-28435 #
PB82-145616 ..... N82-29173 #
PB82-147794 ..... N82-28488 #
PB82-147810 ..... N82-28490 #
PB82-147901 ..... N82-28487 #
PB82-147992 ..... N82-28854 #
PB82-148099 ..... N82-29121 #
PB82-148107 ..... N82-29122 #
PB82-148966 ..... N82-28543 #
PB82-149006 ..... N82-28773 #
PB82-150392 ..... N82-28875 #
PB82-151994 ..... N82-28544 #
PB82-154113 ..... N82-28654 #
PB82-154410 ..... N82-29231 #
PB82-156613 ..... N82-28874 #
PB82-156621 ..... N82-28920 #
PB82-156639 ..... N82-28921 #
PB82-157082 ..... N82-28943 #
PB82-157926 ..... N82-28771 #
PB82-158361 ..... N82-28779 #
PB82-158692 ..... N82-29230 #
PB82-158718 ..... N82-28923 #
PB82-158742 ..... N82-28924 #
PB82-158759 ..... N82-28925 #
PB82-158767 ..... N82-28929 #
PB82-158825 ..... N82-28603 #
PB82-158940 ..... N82-28439 #
PB82-159567 ..... N82-28928 #
PB82-159674 ..... N82-28778 #
PB82-159971 ..... N82-28776 #
PB82-160029 ..... N82-28775 #
PB82-161118 ..... N82-28774 #
PB82-161829 ..... N82-28927 #
PB82-161977 ..... N82-28542 #
PB82-163015 ..... N82-28458 #
PB82-163056 ..... N82-28926 #
PB82-163106 ..... N82-28944 #
PB82-164112 ..... N82-28777 #
PB82-165903 ..... N82-28496 #

PFC/CP-81-1 ..... N82-29188 #

PH-130 ..... N82-28443 #

PHM-08-81 ..... N82-28886 #

PME-FM-81-2 ..... N82-28581 #

PNL-3686-VOL-1 ..... N82-28822 #
PNL-3973 ..... N82-29137 #
PNL-3989 ..... N82-29138 #
PNL-3995-VOL-1 ..... N82-28827 #
PNL-3995-VOL-2 ..... N82-28828 #
PNL-3995-VOL-3 ..... N82-28829 #
PNL-4115 ..... N82-28823 #

PN82-156894 ..... N82-28922 #
PN82-157868 ..... N82-28772 #

PPPL-1874 ..... N82-28426 #

PR-4 ..... N82-28687 #

PSI-TR-312 ..... N82-28588 #

PSR-1121 ..... N82-28509 #

PUB-425 ..... N82-28484 #

PUBL-1787 ..... N82-28844 #

PWA-5512-88 ..... N82-28296* #

P379/TRA6735 ..... N82-28526 #
P379/TR6735 ..... N82-28527 #
P379/TR6735 ..... N82-28528 #

QPR-9 ..... N82-29018 #

QR-1 ..... N82-28473 #
QR-2 ..... N82-28473 #
QR-12 ..... N82-28811 #

R-61 ..... N82-29236 #
R-1527 ..... N82-28273 #
R-1528 ..... N82-28649 #

RADC-TR-81-203 ..... N82-29069 #
RADC-TR-81-226 ..... N82-29157 #
RADC-TR-81-281 ..... N82-28516 #
RADC-TR-81-352 ..... N82-29161 #
RADC-TR-81-373 ..... N82-28558 #
RADC-TR-81-375 ..... N82-28555 #
RADC-TR-81-384-VOL-1 ..... N82-29067 #
RADC-TR-81-384-VOL-2 ..... N82-29068 #
RADC-TR-81-385 ..... N82-29045 #
RADC-TR-81-391 ..... N82-28505 #
RADC-TR-81-400 ..... N82-28556 #
RADC-TR-82-4 ..... N82-28557 #
RADC-TR-82-12 ..... N82-29203 #
RADC-TR-82-22 ..... N82-29159 #
RADC-TR-82-45 ..... N82-28509 #

RAE-AERO-3519 ..... N82-28254

RAE-TM-SPACE-297 ..... N82-28696

RAE-TR-81150 ..... N82-28254

RAND-P-6697 ..... N82-29224 #

RAND-R-2879-EPA ..... N82-28840 #

RAND/N-1500/3-NETH ..... N82-28691 #
RAND/N-1500/16-NETH ..... N82-28692 #
RAND/N-1500/17-NETH ..... N82-28693 #
RAND/N-1500/18-NETH ..... N82-28694 #
RAND/N-1788-RC ..... N82-28782 #
RAND/N-1798-DOE ..... N82-28697 #

RAND/P-6680 ..... N82-29020 #
RAND/P-6688 ..... N82-29219 #
RAND/P-6734 ..... N82-29073 #

RAND/R-2773-NOAA ..... N82-29146 #

REPT-1 ..... N82-29129 #
REPT-1WW/TFRN/81/001 ..... N82-28882 #
REPT-1WW/TFRN/81/002 ..... N82-28883 #
REPT-2 ..... N82-29213 #
REPT-5WW/TFRN-81/004 ..... N82-28884 #
REPT-55 ..... N82-29241 #
REPT-58 ..... N82-28679 #
REPT-59 ..... N82-28679 #
REPT-81-9F3-SIMFN-R1 ..... N82-29124 #
REPT-81-9F7-BOULF-R5 ..... N82-29202 #
REPT-82-1 ..... N82-28997 #
REPT-82-4 ..... N82-28582 #
REPT-82-9J6-EMACK-R1 ..... N82-28524 #
REPT-82-141 ..... N82-29200 #
REPT-84 ..... N82-29187 #
REPT-162-81-7 ..... N82-29231 #
REPT-672 ..... N82-29249
REPT-673 ..... N82-29250
REPT-677 ..... N82-29174
REPT-680 ..... N82-28855
REPT-685 ..... N82-29254
REPT-791 ..... N82-28416 #
REPT-0737R-1 ..... N82-28794 #
REPT-1174-1 ..... N82-28300* #
REPT-1326-01-15-2529 ..... N82-28274 #
REPT-1378-01-3-2652 ..... N82-28275 #
REPT-4778 ..... N82-28298* #

RHO-LD-81-101-B ..... N82-29151 #

RI/RD82-226 ..... N82-28382 #

RL-81-091 ..... N82-29242

RSG-317-82-VOL-1 ..... N82-28320 #

RSRE-MEMO-3390 ..... N82-28498
RSRE-MEMO-3398 ..... N82-29156
RSRE-MEMO-3400 ..... N82-28504
RSRE-MEMO-3418 ..... N82-28497
RSRE-MEMO-3433 ..... N82-28856
RSRE-MEMO-3450 ..... N82-28546
RSRE-MEMO-3464 ..... N82-29019

RTCA/DO-137 ..... N82-28270 #
RTCA/DO-179 ..... N82-28270 #

RTI/2094/02-02F ..... N82-29022* #

R76-4 ..... N82-28281* #
R82AEB198 ..... N82-28297* #

SAC/LGME-ER-P-372 ..... N82-28307 #

SAI-82-686-WA ..... N82-29177 #

SAND-79-1483-REV ..... N82-29223 #
SAND-79-2379 ..... N82-28870 #
SAND-80-7147/1 ..... N82-28810 #
SAND-81-0944 ..... N82-28812 #
SAND-81-1165 ..... N82-28820 #
SAND-81-1239 ..... N82-28680 #
SAND-81-1459 ..... N82-29183 #
SAND-81-1552 ..... N82-28570 #
SAND-81-1705 ..... N82-28818 #
SAND-81-1831 ..... N82-28819 #
SAND-81-1933 ..... N82-28532 #
SAND-81-2112 ..... N82-28567 #
SAND-81-2193 ..... N82-29064 #
SAND-81-2470 ..... N82-29085 #
SAND-81-7027 ..... N82-28833 #
SAND-81-7086/5 ..... N82-28836 #
SAND-81-7090/3 ..... N82-28809 #
SAND-81-7090/4 ..... N82-28835 #
SAND-81-8226 ..... N82-29062 #
SAND-81-8777 ..... N82-28681 #

SCIENTIFIC-2 ..... N82-28859 #

SD-TR-81-05 ..... N82-29257 #
SD-TR-81-86 ..... N82-28324 #
SD-TR-81-107 ..... N82-28632 #
SD-TR-81-110 ..... N82-29244 #
SD-TR-81-111 ..... N82-28360 #
SD-TR-82-19 ..... N82-28380* #
SD-TR-82-23 ..... N82-28867 #
SD-TR-82-24 ..... N82-28635 #

SEL-78-002 ..... N82-29021* #
SEL-78-004 ..... N82-29040* #
SEL-78-102 ..... N82-29041* #
SEL-80-003 ..... N82-29042* #
SEL-81-014 ..... N82-29043* #

SER-A-92 ..... N82-28872 #

SERI/PR-623-740 ..... N82-28813 #
SERI/PR-8062-1-T13 ..... N82-28811 #
SERI/PR-9079-1-T5 ..... N82-29213 #

SERI/TP-212-1469 ..... N82-28566 #
SERI/TP-212-1489 ..... N82-28398 #

SERI/TR-215-1379 ..... N82-28825 #
SERI/TR-611-1186 ..... N82-28814 #
SERI/TR-632-880 ..... N82-28805 #

SKF-AT81D016 ..... N82-28647 #

SOLAR/0005-81/82 ..... N82-28808 #
SOLAR/0010-81/10 ..... N82-28850 #
SOLAR/1040-81/50 ..... N82-28807 #
SOLAR/1081-81/14 ..... N82-28806 #

SP-A-82:02 ..... N82-28684 #

SP-RAPP-1981:20 ..... N82-28485 #
SP-RAPP-1982:01 ..... N82-28683 #

SR-1 ..... N82-28865 #
SR-2 ..... N82-28859 #
SR-3 ..... N82-29076 #

SRA-R82-920001-F ..... N82-28584 #
SRA-R82-920009-F ..... N82-28589 #

SRC-CR-81-54 ..... N82-29159 #

SRD-81-076 ..... N82-29109 #

SR81-R-4526-02 ..... N82-28418 #

STEWS-ID-81-2 ..... N82-28506 #

STL-78-001 ..... N82-29023* #

STL-78-002 ..... N82-29024* #
STL-79-001 ..... N82-29025* #
STL-79-002 ..... N82-29026* #
STL-79-003 ..... N82-29027* #
STL-80-001 ..... N82-29028* #
STL-80-003 ..... N82-29030* #
STL-80-004 ..... N82-29031* #
STL-80-005 ..... N82-29056* #
STL-81-001 ..... N82-29032* #
STL-81-002 ..... N82-29033* #
STL-81-003 ..... N82-29034* #
STL-81-004 ..... N82-29035* #
STL-82-001 ..... N82-29037* #
STL-82-002 ..... N82-29038* #
STL-82-007 ..... N82-29039* #

SU-JIAA-TR-34 ..... N82-28572* #
SU-JIAA-TR-46 ..... N82-29074* #

SU-SLAC-244 ..... N82-29014 #
SU-SLAC-244 ..... N82-29061 #

SU-STAN-CS-81-868 ..... N82-29044 #
SU-STAN-CS-81-873 ..... N82-29014 #
SU-STAN-CS-81-873 ..... N82-29061 #
SU-STAN-CS-81-898 ..... N82-29226 #

TACOM-12609 ..... N82-28650 #

TDCK-75105 ..... N82-28996 #
TDCK-75134 ..... N82-29117 #
TDCK-75535 ..... N82-29115 #
TDCK-75536 ..... N82-29116 #

TPD-008-785/1 ..... N82-29117 #
TPD-908-720 ..... N82-29116 #
TPD-1981-0-2(105.106) ..... N82-29115 #

TR-2 ..... N82-28385 #
TR-3 ..... N82-28384 #
TR-4 ..... N82-28273 #
TR-4 ..... N82-28376 #
TR-4 ..... N82-28649 #
TR-15 ..... N82-28373 #
TR-15 ..... N82-28452 #
TR-16 ..... N82-28453 #
TR-17 ..... N82-28677 #
TR-18 ..... N82-28381 #
TR-18 ..... N82-28633 #
TR-19 ..... N82-29126 #
TR-24 ..... N82-28670 #
TR-34-81 ..... N82-29053 #
TR-45 ..... N82-29178 #
TR-81-014 ..... N82-28999 #
TR-81-022 ..... N82-28988 #
TR-81/15 ..... N82-28907 #
TR-81/20 ..... N82-29051 #
TR-82-2 ..... N82-28930 #
TR-82-2 ..... N82-29080 #
TR-86 ..... N82-28682 #
TR-145 ..... N82-29098 #
TR-210-SER-2 ..... N82-29099 #
TR-217-SER-2 ..... N82-29050 #
TR-348 ..... N82-29164 #
TR-377-PT-2 ..... N82-29096 #
TR-563 ..... N82-28525 #
TR-592 ..... N82-28515 #
TR-602 ..... N82-28513 #
TR-0081(6950-05)-2 ..... N82-28324 #
TR-0082(2603)-1 ..... N82-28635 #
TR-0082(2729)-1 ..... N82-28380* #
TR-0082(2935-01)-1 ..... N82-28360 #
TR-0082(2940-01)-3 ..... N82-29257 #
TR-0082(2940-05)-1 ..... N82-29244 #
TR-0082(2940-05)-6 ..... N82-28867 #
TR-0082(2945-09)-1 ..... N82-28632 #

TRITA-EPP-81-07 ..... N82-29195 #

TRITA-NA-8106 ..... N82-29093 #
TRITA-NA-8107 ..... N82-29092 #
TRITA-NA-8108 ..... N82-29091 #
TRITA-NA-8118 ..... N82-29089 #
TRITA-NA-8119 ..... N82-29090 #

TRITA-PFU-82-05 ..... N82-29172 #

TRW-SN-36833 ..... N82-29182 #

TRW-38651-000 ..... N82-28349* #

TSARCOM-TR-82-2 ..... N82-29232 #

TTI-2-18-78-228-6 ..... N82-29239 #
TTI-2-18-78-228-7 ..... N82-29240 #

TUM-LRT-TB-81/1 ..... N82-29252 #
TUM-LRT-TB-81/3 ..... N82-29153 #
TUM-LRT-TB-81/6 ..... N82-29248 #
TUM-LRT-TB-81/11 ..... N82-28352 #
TUM-LRT-TB-81/13 ..... N82-29253 #
TUM-LRT-TB-81/14 ..... N82-29194 #

TVA/OP/ECR-81/71-VOL-1 ..... N82-28913 #
TVA/OP/ECR-81/71-VOL-2 ..... N82-28914 #
TVA/OP/ECR-81/71-VOL-3 ..... N82-28915 #
TVA/OP/ECR-81/71-VOL-4 ..... N82-28916 #

U-6696 ..... N82-28372 #

UAG-81 ..... N82-29255 #

UCB/EERC-81/11 ..... N82-28489 #

UCID-18595-REV-1 ..... N82-28764 #
UCID-18947-PT-3-REV-1 ..... N82-29186 #
UCID-19241 ..... N82-29185 #
UCID-19242 ..... N82-28804 #
UCID-19244 ..... N82-28826 #
UCID-19262 ..... N82-28594 #
UCID-19264 ..... N82-29060 #

UCRL-TRANS-11734 ..... N82-29169 #

UCRL-15386 ..... N82-28456 #
UCRL-15404 ..... N82-28362 #
UCRL-15416-VOL-2 ..... N82-28595 #
UCRL-15423 ..... N82-28766 #
UCRL-50400-VOL-6-REV-3 ..... N82-29139 #
UCRL-53029 ..... N82-28871 #
UCRL-53137 ..... N82-28796 #
UCRL-53233 ..... N82-28851 #
UCRL-85821 ..... N82-28468 #
UCRL-86473 ..... N82-28470 #

US-PATENT-APPL-SN-93714 ..... N82-28780*
US-PATENT-APPL-SN-079913 ..... N82-28279*
US-PATENT-APPL-SN-119339 ..... N82-28616*
US-PATENT-APPL-SN-145207 ..... N82-28368*
US-PATENT-APPL-SN-145272 ..... N82-28545*
US-PATENT-APPL-SN-161254 ..... N82-28441*
US-PATENT-APPL-SN-163838 ..... N82-28353*
US-PATENT-APPL-SN-173518 ..... N82-29013*
US-PATENT-APPL-SN-218587 ..... N82-28440*
US-PATENT-APPL-SN-219680 ..... N82-28442*
US-PATENT-APPL-SN-225501 ..... N82-28780*
US-PATENT-APPL-SN-235796 ..... N82-28604*
US-PATENT-APPL-SN-359382 ..... N82-28502* #
US-PATENT-APPL-SN-368189 ..... N82-28318* #
US-PATENT-APPL-SN-379601 ..... N82-29112* #
US-PATENT-APPL-SN-379602 ..... N82-28784* #
US-PATENT-APPL-SN-383083 ..... N82-28550* #
US-PATENT-APPL-SN-385220 ..... N82-28618* #
US-PATENT-APPL-SN-387647 ..... N82-28619* #
US-PATENT-APPL-SN-387648 ..... N82-28642* #
US-PATENT-APPL-SN-392092 ..... N82-28444* #
US-PATENT-APPL-SN-392093 ..... N82-28549* #
US-PATENT-APPL-SN-392094 ..... N82-28640* #
US-PATENT-APPL-SN-392103 ..... N82-28785* #
US-PATENT-APPL-SN-392104 ..... N82-28641* #
US-PATENT-APPL-SN-394280 ..... N82-29002*
US-PATENT-APPL-SN-683073 ..... N82-28780*
US-PATENT-APPL-SN-837513 ..... N82-28780*

US-PATENT-CLASS-29-572 ..... N82-28780*
US-PATENT-CLASS-65-21.4 ..... N82-28442*
US-PATENT-CLASS-65-22 ..... N82-28442*
US-PATENT-CLASS-65-142 ..... N82-28442*
US-PATENT-CLASS-148-175 ..... N82-28780*
US-PATENT-CLASS-165-46 ..... N82-29002*
US-PATENT-CLASS-203-12 ..... N82-28368*
US-PATENT-CLASS-204-192E N82-28440*
US-PATENT-CLASS-204-192EC N82-28440*
US-PATENT-CLASS-204-195B N82-28604*
US-PATENT-CLASS-244-48 ..... N82-28279*
US-PATENT-CLASS-244-194 ..... N82-29013*
US-PATENT-CLASS-250-214 ..... N82-28545*
US-PATENT-CLASS-250-221 ..... N82-28545*
US-PATENT-CLASS-264-5 ..... N82-28442*
US-PATENT-CLASS-264-22 ..... N82-28440*
US-PATENT-CLASS-264-220 ..... N82-28440*
US-PATENT-CLASS-318-564 ..... N82-29013*
US-PATENT-CLASS-330-4.3 ..... N82-28616*
US-PATENT-CLASS-371-68 ..... N82-29013*
US-PATENT-CLASS-372-56 ..... N82-28616*
US-PATENT-CLASS-372-58 ..... N82-28616*
US-PATENT-CLASS-372-82 ..... N82-28616*
US-PATENT-CLASS-422-186 ..... N82-28368*
US-PATENT-CLASS-422-198 ..... N82-28368*
US-PATENT-CLASS-423-235 ..... N82-28368*
US-PATENT-CLASS-423-539 ..... N82-28368*
US-PATENT-CLASS-423-540 ..... N82-28368*
US-PATENT-CLASS-423-542 ..... N82-28368*
US-PATENT-CLASS-423-579 ..... N82-28368*
US-PATENT-CLASS-423-648R N82-28368*
US-PATENT-CLASS-425-6 ..... N82-28442*
US-PATENT-CLASS-427-74 ..... N82-28780*
US-PATENT-CLASS-427-205 ..... N82-28441*
US-PATENT-CLASS-427-253 ..... N82-28441*
US-PATENT-CLASS-427-405 ..... N82-28441*
US-PATENT-CLASS-427-531 ..... N82-28780*
US-PATENT-CLASS-428-141 ..... N82-28440*
US-PATENT-CLASS-428-938 ..... N82-28441*
US-PATENT-CLASS-428-941 ..... N82-28441*
US-PATENT-CLASS-435-34 ..... N82-28604*
US-PATENT-CLASS-435-39 ..... N82-28604*
US-PATENT-CLASS-435-291 ..... N82-28604*
US-PATENT-CLASS-528-401 ..... N82-28353*
US-PATENT-CLASS-528-422 ..... N82-28353*
US-PATENT-CLASS-547-131 ..... N82-28353*
US-PATENT-CLASS-564-229 ..... N82-28353*

US-PATENT-3,295,594 ..... N82-29002*
US-PATENT-4,278,830 ..... N82-28780*
US-PATENT-4,310,574 ..... N82-28441*
US-PATENT-4,313,745 ..... N82-28442*
US-PATENT-4,314,984 ..... N82-28368*
US-PATENT-4,316,035 ..... N82-28353*
US-PATENT-4,319,133 ..... N82-28545*
US-PATENT-4,321,099 ..... N82-28780*
US-PATENT-4,327,437 ..... N82-29013*
US-PATENT-4,328,464 ..... N82-28616*
US-PATENT-4,329,385 ..... N82-28440*
US-PATENT-4,330,100 ..... N82-28279*
US-PATENT-4,335,206 ..... N82-28604*

USAAEFA-80-13 ..... N82-28289 #

USAAVRADCOM-TR-81-D-43 ..... N82-28260 #
USAAVRADCOM-TR-82-D-5 ..... N82-28261 #
USAAVRADCOM-TR-82-F-3 ..... N82-28290 #
USAAVRADCOM-TR-82-F-5-PT-7 ..... N82-28657 #

USAFESA-TS-2104 ..... N82-28377 #

USAFETAC/DS-81/10 ..... N82-28898 #
USAFETAC/DS-81/002 ..... N82-28894 #
USAFETAC/DS-81/006 ..... N82-28890 #
USAFETAC/DS-81/049 ..... N82-28897 #
USAFETAC/DS-81/081 ..... N82-28897 #
USAFETAC/DS-81/095 ..... N82-28889 #
USAFETAC/DS-81/100 ..... N82-28889 #
USAFETAC/DS-81/102 ..... N82-28894 #
USAFETAC/DS-81/103 ..... N82-28890 #
USAFETAC/DS-81/104 ..... N82-28900 #
USAFETAC/DS-81/105 ..... N82-28896 #
USAFETAC/DS-82/003 ..... N82-28895 #
USAFETAC/DS-82/005 ..... N82-28899 #
USAFETAC/DS-82/006 ..... N82-28893 #
USAFETAC/DS-82/007 ..... N82-28892 #
USAFETAC/DS-82/008 ..... N82-28891 #
USAFETAC/DS-82/012 ..... N82-28887 #

USARIEM-M-13/82 ..... N82-28993 #

USCG-D-51-81 ..... N82-28271 #

USGS-CIRC-847 ..... N82-29145 #

USGS-OFR-81-988 ..... N82-28869 #

USGS-WDR-AL-80-1 ..... N82-28777 #

USGS-WDR-WV-80-A ..... N82-28778 #

USGS/WDR/MS-80/1 ..... N82-28773 #

USGS/WRD/HD-80-003 ..... N82-28778 #
USGS/WRD/HD-81/083-VOL-1 ..... N82-28777 #
USGS/WRD/HD-81/091 ..... N82-28773 #

USIP-81-11 ..... N82-29258 #

UTRC-R-80-954490-20 ..... N82-28822 #

UTRC/R82-925096-1 ..... N82-28634 #

UVA/525098-MAE-82/10 ..... N82-28301 #

VPI-E-81.34 ..... N82-28367 #

W/A-1655 ..... N82-28355 #

WES/MP/GL-82-1 ..... N82-28481 #

WHOI-81-102 ..... N82-28590 #
WHOI-82-1 ..... N82-28943 #

WJSA-FTR-82-193 ..... N82-28625 #

WRC-R-310 ..... N82-28622 #

WSRL-0211-TR ..... N82-28319 #
WSRL-0236-TM ..... N82-28257 #

W82-02533 ..... N82-28772 #
W82-02539 ..... N82-28771 #

Y-2256 ..... N82-29212 #
Y-2257 ..... N82-29168 #

Y/DV-180 ..... N82-28651 #

☆U.S. GOVERNMENT PRINTING OFFICE: 1982-361-561:2018

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*' from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business

Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

U.S.MAIL

4 1 STAR, 820920 S01733MU
UNIV OF MICHIGAN
GRADUATE LIBRARY
DOCUMENT UNIT SERIALS DIV
ANN HARBOR MI 48109

POSTMASTER: If Undeliverable (Section 15
Postal Manual) Do Not Re